The IRON AGE

October 29, 1959 A Chilton Publication The National Metalworking Weekly

Autolite's Lewis and Spaulding—

Miniaturization: Pack More Control In Less Space P. 119

Special Report: Why Steel Talks Failed — P. 79

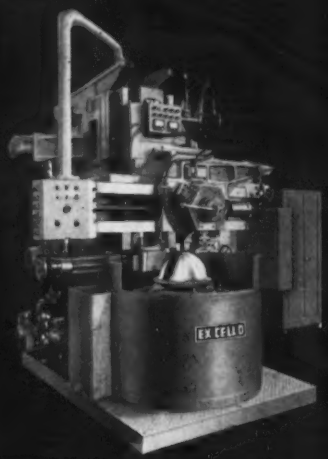
Automation Tames Tough Assembly Jobs — P. 124

Digest of the Week — P. 2-3

XLO

EX-CELL-O FOR PRECISION

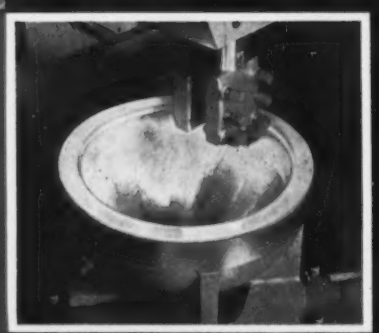
LEFT: Single tracer-controlled tool contours aluminum forging to .080" wall thickness holding .001" tolerance inside and outside.



ABOVE: Compact Vertical Contouring Machine handles medium or large workpieces. Slim cabinet at right side holds electronic tracer controls.

Critical Contour Tolerances?

HOLDS WITHIN .001' OF TRUE CONTOUR—INSIDE AND OUT



Close-up shows Style 416 contouring the inside surface. Workpiece is held in a vacuum fixture mounted on the machine table.

58-7

Contouring within .001" of true contour—inside and out—*without waste* requires the kind of precision built into an Ex-Cell-O Style 416 Vertical Contouring Machine.

The aluminum forging illustrated was first contoured on its periphery with a single electronic-tracer-controlled tool, then precision-finished inside to .080" wall thickness.

Designed for contouring hemispherical or irregularly-shaped surfaces, Ex-Cell-O Style 416 Machines also face, bore, turn, groove and chamfer with automatic cycling between loading and unloading.

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The IRON AGE

October 29, 1959—Vol. 184, No. 18

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Chief Tom Campbell analyzes the issues, tells the background of how and why negotiations failed. P. 79

CRYOGENICS

Steel's Bid—Steelmakers are ready to meet aluminum head-on in a bid for share of the cryogenic—ultra-cold-market. Its entry is a 9 pct nickel steel. P. 85

MACHINING

Look Into Tomorrow — Here's what electrical engineers at the 11th annual machine tool conference were told to expect in the machine tools of the future. P. 86

SPACE RESEARCH

Shifting to NASA—The Army's

Metalworking

◀ COVER FEATURE

MINIATURIZATION: Engineers are finding ways to pack more control equipment in less space. At The Electric Autolite Co., Toledo, G. S. Lewis (left) and G. Spaulding chart new plans to increase engineering room. P. 119

missile team may soon be transferred to the National Aeronautics and Space Administration. President backs move, but Congress may be critical. P. 87

FACT FINDING

More Use—Officials are planning the use of more arbitration in future nationwide wage disputes. P. 99

FEATURE ARTICLES

SHAPE HONEYCOMBS

With Chemical Milling—Aircraft builders are leaning more toward honeycomb structures. Here's a new method to further their use even more. It comes up with the same physical properties obtained by current cutting or crushing techniques. And at less cost. P. 122

PROCESS SHEET METALS

In New Line — Automatic handling can tame the hard-to-handle sheetmetal assemblies. It pays off in sequences that involve stamping, forming, assembly and welding. There's sixfold savings in direct labor charges alone, a big advance in efficiency. P. 124

CUT MACHINE TIME

On Tough Parts—By replacing nine turret lathes with five automatic turrets, production soars. Better machines help one auto plant to halve its machining time. The company also nets increased tool life and less changeover time. P. 128

BETTER DIE DESIGNS

Improve Blanking Output—Sound thinking pays off in one plant where the die blanks, notches and pierces eight totally different parts. It's based on a sensible module system. P. 130

END ROLL GRINDING WOES

Using Step-by-Step Procedures—Finishes on sheet and plate are only as good as the finish on the rolls that do the work. Here is some essential information on this controversial subject. By following three basic rules, the operator can produce the required finishes on rolls in jig time. P. 132

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AFRICA

Growing Economy—African economy is growing rapidly and African nations are looking for U. S. industrialists to explore their markets. P. 84

SMALL CARS

Get Test Runs—Putting the new small cars through their paces under identical conditions shows each has its special merits. The buyer will have to decide which one suits his special needs best. P. 95

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15 Miles High—By 1970 it is expected that commercial jetliners will streak across country at 2000 mph. P. 101

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NEXT WEEK

MARKETING COSTS

Hold Them Down—Distribution cost analysis can do much to cut excessive marketing costs. Next week Consultant T. G. McGann starts the first of a new series on this vital new area of marketing.

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Photo courtesy U.S. Steel Corporation, Irvin Works

Launching tomorrow's car in steaming hot acid

B. F. Goodrich improvements in rubber brought extra savings

HERE comes steel for another new car. To clean rust off metal so enamel will stick, long, continuous ribbons of steel are run through tanks of hot acid.

The fast-moving steel used to travel over stationary shafts or skid blocks placed between the tanks. But these wore out fast with rubbing plus heat plus acid. Ceramic caps were tried. They lasted longer, but scratched the steel, sometimes ruined it.

B.F.Goodrich engineers went to work on the problem. They designed a roll made up of series of doughnut-shaped rings which revolve as the strip speeds over them. The rolls are covered with a special tough rubber that stands heat, acid, cutting; yet doesn't mar the finish of the steel.

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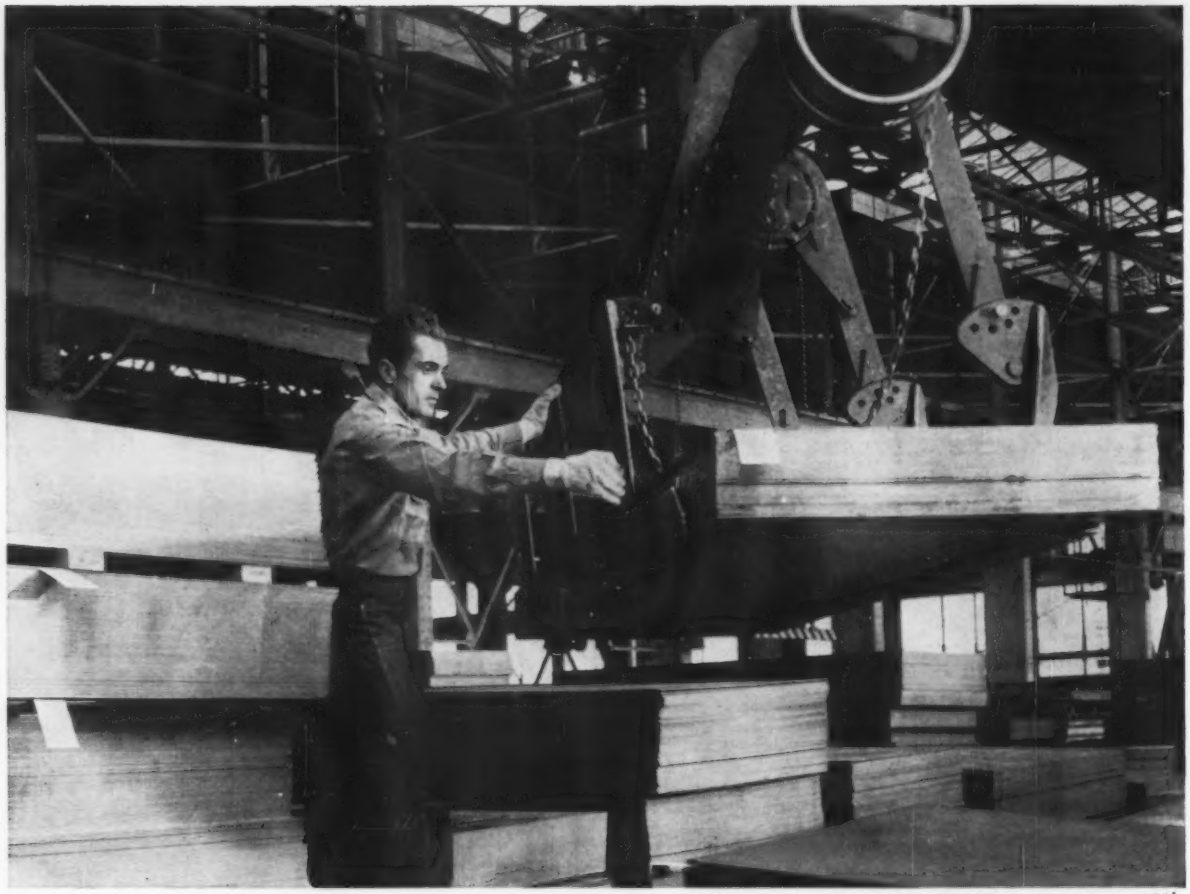

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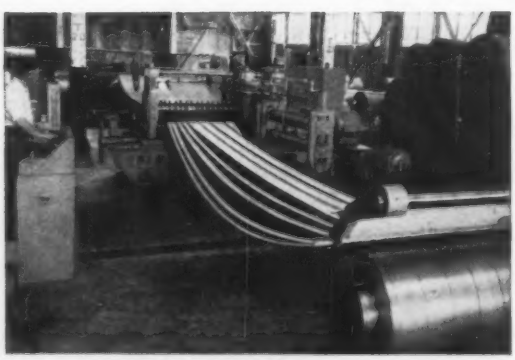

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National Emergency: How Long Ago Did It Start?

Last week the steel union said there was no steel shortage crisis. It argued that there was no national emergency in its attempt to stay a Taft-Hartley injunction. While learned judges listened, the crisis worsened.

Three weeks ago The IRON AGE said the steel crisis started in mid-September. That statement was based on combined market and reporting experience of more than 100 years.

Last week the government lawyers said there were about 10 million tons of steel in the nation. By their own figures (they made a blunder) there was less than 9 million tons. When the men get back to their jobs there will be less than 5 million tons of steel.

Two weeks ago some industry people were soft pedaling the steel shortage. Why, no one knows. At that time, plants were shutting down or curtailing all over the place. Lack of publicity, it was believed, might be better for the steel case if hardships were not spelled out. That philosophy flopped.

Yet that was what the union wanted. To indicate that there was no emergency. But with autos, farm implements appliances and stampings being affected right and left, the emergency became visible.

Also, with construction jobs floundering throughout the country, the real situation now became understandable even to those whose knowledge of steel and steel markets is nil.

The union's counsel, Arthur J. Goldberg, threw the entire industry into a shock last week when he got a stay in the injunction. This further compounded the crisis. Mr. Goldberg's goal of reducing steel inventories to force a quicker settlement by management was one step nearer last week.

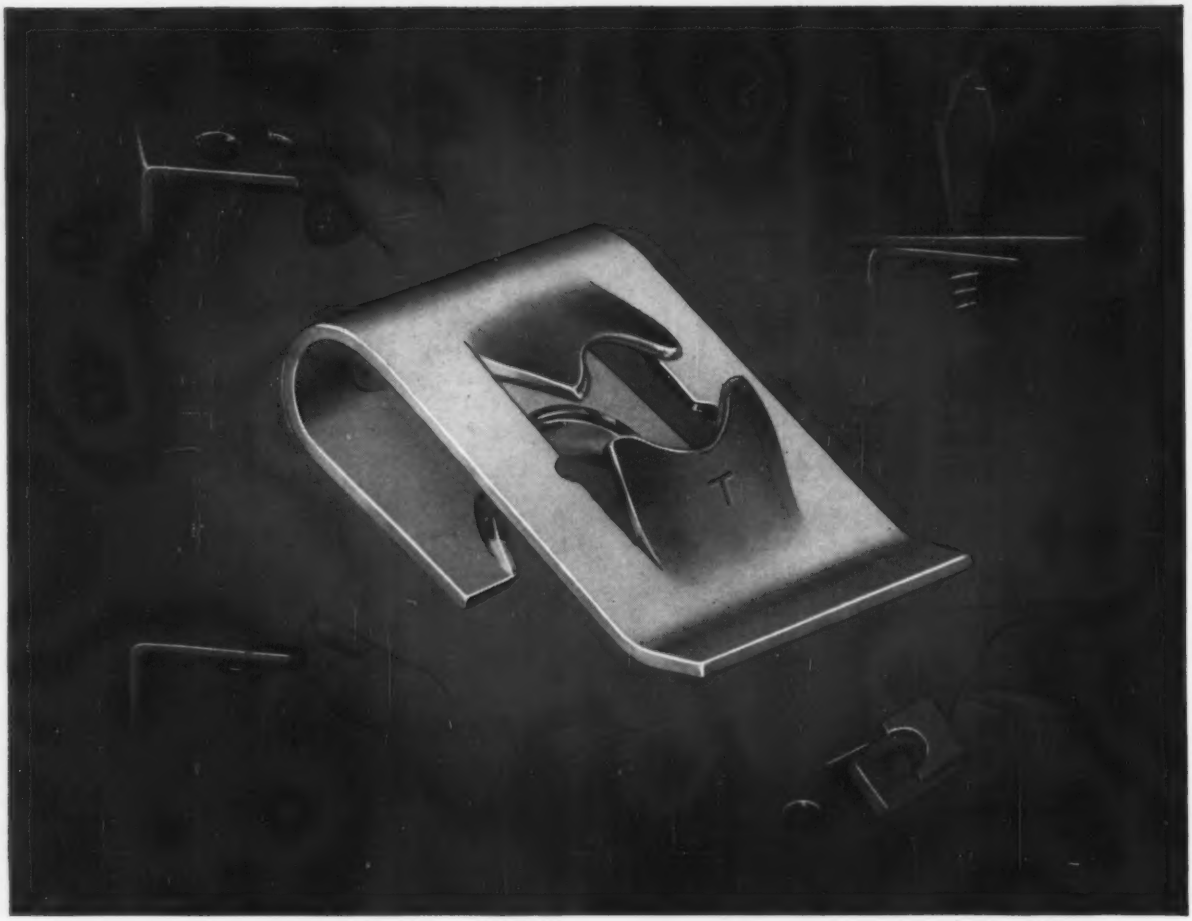
For those who wanted to study the situation, the emergency was apparent a month ago. There were no more than 24 million tons of steel on July 15, the start of the strike. In 15 weeks, more than 19.5 million tons were consumed from inventories leaving less than 5 million tons.

The emergency in the economy will now become far worse after the mills start up again in full production. Lack of knowledge, misplaced figures, and politics by some of the President's advisors have helped bring on this unprecedented and crippling steel emergency.

Plus, of course, the adamancy of both sides in the dispute!

Tom Campbell

Editor-in-Chief



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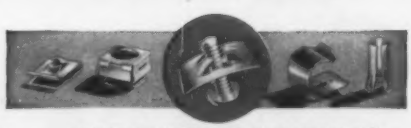

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Lower Electric Steel Costs

Watch electric furnace practice for significant cost reductions for the next six months. Oxygen injection during the melt cycle, and propane additions to raise Btu level are two that are under study in at least 15 electric furnace operations. A third cost cutter is the use of low-cost scrap to lick excessive decarburization encountered with oxygen use in the past.

Liquids Carburize Quickly

It's been reported that steel submerged in an organic liquid, and heated by normal industrial frequency currents, carburizes very quickly. Heating by direct current produces the same results. The fast rate of carburization is explained by the way the active carbon is derived from the liquid. There's no soot formation to slow diffusion.

Alloy Is Thermal "Friend"

The thermal expansion of Kovar, an iron-nickel-cobalt alloy, is getting it a lot of attention. Its expansion curve matches closely those of several hard glasses, ceramics, and carbides. Uses include: matched-expansion sealing joints for electrical applications; mounting attachments of ceramic radomes to missiles; and back-up blocks for carbide dies.

Titanium Boosts Payload

Use of weight-saving Ti-6A1-4V in the rocket that placed Pioneer IV in orbit added 2 lb to the payload. It enabled scientists to include lead tube-shielding, a radio monitor, and de-spin mechanism in the satellite. Total payload was 13.4 lb.

Tantalum-Tungsten Alloys

New alloys of tantalum and tungsten are an answer to the call for metals to withstand the tremendous heat generated in large rocket motors. Developed by Stauffer-Temescal Co., these metals have melting points which range from 5430°-6150°F. The tensile strength of worked 90 pct Ta-10 pct W is 150,000 psi at room temperature. At 4500°F, the strength is still about 15,000 psi. Because of high purity, the alloys are easily fabricated.

Machines the Superalloys

Complete equipment for electrolytic machining of high-temperature alloys promises to widen the field of metal removal. Made by Anocut Engineering Co., the machine tool sinks irregular shapes and holes, following the contour of an electrode made for the purpose. The equipment differs from conventional electro-discharge machines. It maintains faster removal rates with no electrode wear.

Convert Coke Oven Product

At least four steel mills are studying a technique to boost benzene output by conversion of two other coke oven products. Reason: the long range benzene market is strong and the move will take these mills from a low demand market to a higher demand with a greater price stability.

New Prototype Material

Look for boron nitride to be used as construction material for prototype electrical parts. The product has excellent electrical characteristics under both high and low temperature conditions. Moreover, it can be readily machined with standard steel cutting tools. This permits the production of intricate and close tolerance shapes in a very short time.

Welds Thick Sections

Encouraging electro-slag welding results are reported by Rockwell Ltd. in England. Based on the Vus patents, the redeveloped machine is designed to weld sections between 1¼ and 14 in. thick. A previous disadvantage with this method was the poor low temperature impact values. Rockwell now reports Charpy keyhole impact of 36-50 ft-lb from non-heat-treated samples.

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Q. So with Weirkote you bypass the need for further corrosion protection?

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LETTERS FROM READERS

Red Danger

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Communications

Sir—Will you send me a reprint of the article entitled "New Communications Systems Widen Business Horizons" which appeared in your Oct. 8 issue.—R. L. Zimmermann, Systems Supervisor, Bethlehem Steel Co., Pacific Coast Div., San Francisco.

Sir—Please send me a reprint of this article.—T. J. Fleming, Olin Mathieson Chemical Corp., Aluminum Rolling Mill, Hannibal, O.

Sir — I would appreciate your sending me twelve reprints of this article. — M. T. Goetz, President, Teletype Corp., Skokie, Ill.

"Sir, I'd like to marry your daughter. How about introducing me?"

Iron Making

Sir—We would appreciate six reprints of the article "Will New Iron-Making Methods Cut Blast Furnace Operations?" which appeared in your Oct. 8 issue.

We find this article very interesting and one of the first concise attempts at describing the numerous new methods being developed in this field. — J. F. Lee, Philipp Brothers Ore Corp., New York.

Company Growth

Sir—Please send me six reprints of the article "How to Prepare for Future Company Growth" by Morehead Patterson, Chairman, American Machine & Foundry Co. This was published in your Oct. 15 issue. —C. G. Ott, Plant Manager, Vari-Typer Corp., Newark, N. J.

Sir—We would like to have another copy of the article "How to Prepare For Future Company Growth." — R. J. Duffy, Ass't. Librarian, Federal Systems Div., IBM Corp., Owego, New York.

Sir—I would appreciate receiving six copies of the article "How to Prepare for Future Company Growth."—H. J. Watt, President, Canton Co. of Baltimore, Baltimore.

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Inside Negotiations

We share in the universal sympathy to all the victims of the steel strike. But we are beginning to feel somewhat like victims ourselves.

Throughout the entire negotiations, we have worked late, planned hard, stretched our deadlines and editorial personnel to the very limits. We think we have done a good job in bringing our readers the best and most timely coverage of any strike any where. And it's been tough.

Heavy Burden—But the real burden has been carried by Editor-in-Chief Tom Campbell. He has been in the forefront since negotiations started way last April.

IRON AGE readers are as familiar with Tom's reporting as they are with their own favorite chair. He has been covering the steel labor front for them for more than 23 years.

Behind The Talks—This week we think he has topped all other efforts. Starting on p. 79 is a complete report on the strike to date, the forces that caused collective bargaining to break down, and inside facts that have never been brought out before. Personalities aren't spared.

After you read it, you will know as much about the real story of the steel negotiations as it's possible to know, unless you are one of the negotiators or on their supporting teams.

More Than A Phone

What can you do with a telephone except answer it? Apparently quite a lot.

One of our men who stopped by the National Business Show in New York City mentions the wide variety of new phone equipment shown. You can now get a germ killing phone with a built-in sanitizing system. There's a pushbutton telephone with a "brain" which is a master inter-office communications center. And small companies can buy a miniature telephone system to save space.

Copy Devices Popular—Another device allows you to write out an order, have it transmitted over the phone, and reproduced at the other end of the line.

Incidentally, our man says duplicating and reproducing techniques are getting lots of attention. The show contains many booths featuring equipment for all types of copying.

Salute Correction

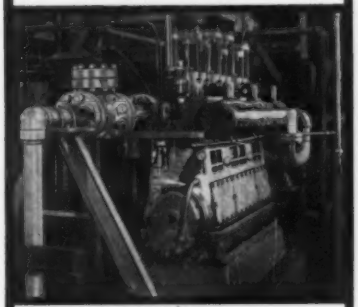
In our Oct. 22 issue we were proud to salute Allen Ray Putnam, new managing director of the American Society for Metals.

However, we were not proud of incorrectly referring to him as the president of ASM.

That title properly belongs to Walter Craft, associate director of technology, Union Carbide Metals Co. You'll probably be reading more about the real president in the near future.

"Knock it off, Riley!"

COMPLETE CENTRAL HYDRAULIC SYSTEMS FOR



die casting

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From Aldrich you get all the benefits of unified engineering plus the newest in pumping equipment. Aldrich Direct Flow Pumps to 2500 hp. Aldrich-Groff Controllable Capacity pumps to 125 hp. Pressures to meet your requirements. Write for data.

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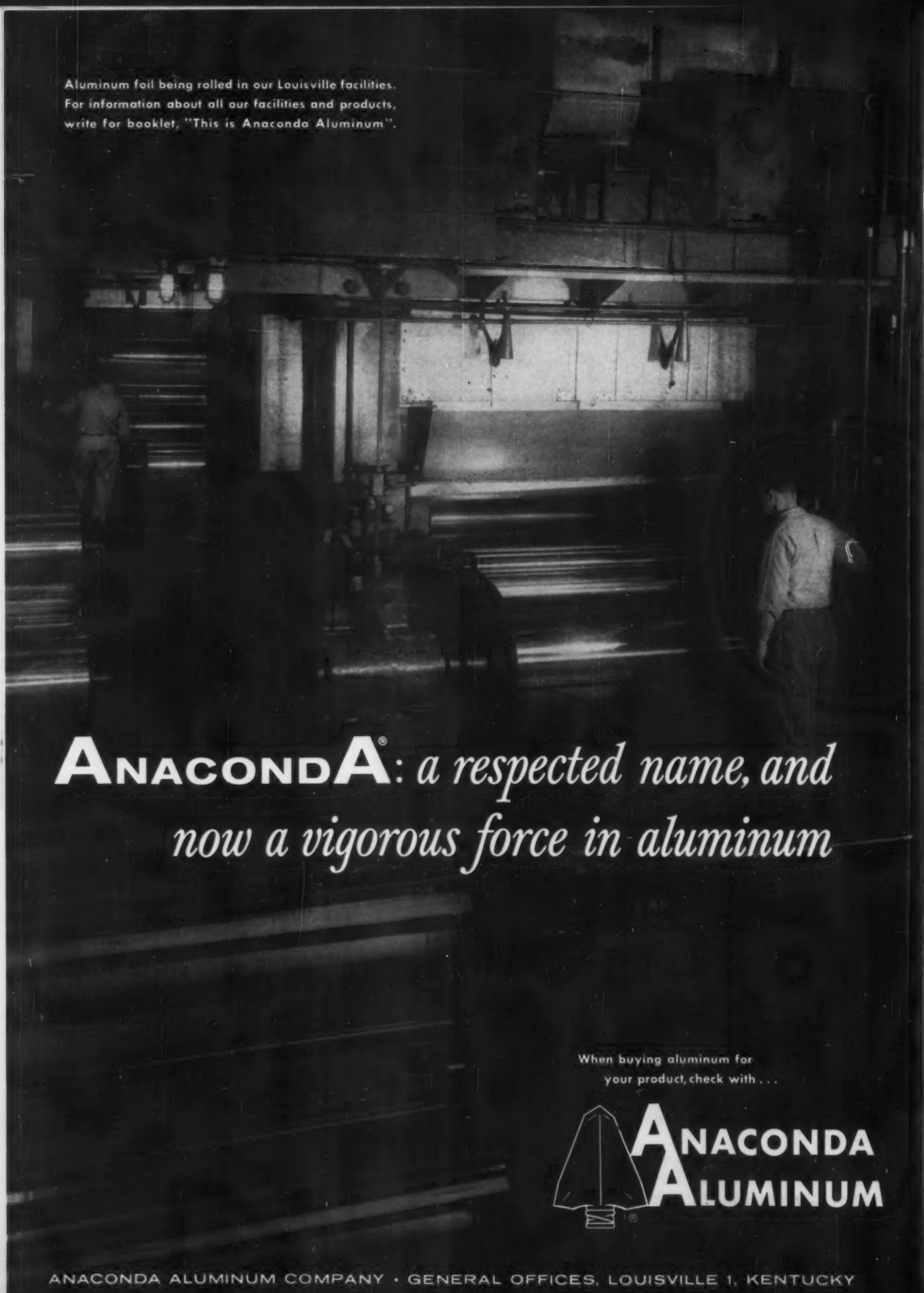

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COMING EXHIBITS

Metal Show — Nov. 2-6, International Amphitheatre, Chicago. (American Society for Metals, Metals Park, Novelty, Ohio.

Air-Conditioning & Refrigeration Show — Nov. 2-5, Atlantic City, N. J. (Air-Conditioning and Refrigeration Institute, 1346 Connecticut Ave., N. W., Washington, D. C.)

MEETINGS

OCTOBER

The Assn. of American Battery Manufacturers Inc. — Fall convention, Oct. 29-31, The Palmer House, Chicago. Association headquarters, 19 N. Harrison St., E. Orange, N. J.

National Metal Trades Assn.—Convention, Oct. 29-31, Sheraton-Biltmore Hotel, Providence, R. I. Association headquarters, 337 W. Madison St., Chicago.

NOVEMBER

Society for Non-Destructive Testing, Inc.—Annual convention, Nov. 2-6, Hotel Hamilton, Chicago. Society headquarters, 1109 Hinman St., Evanston, Ill.

Institute of Metals Div., AIME—Fall meeting, Nov. 2-6, Morrison Hotel, Chicago. Institute headquarters, 29 E. 39th St., New York.

National Tool & Die Manufacturers Assn. — Annual convention, Nov. 4-8, Statler Hotel, New York. Association headquarters, 907 Public Square Bldg., Cleveland.

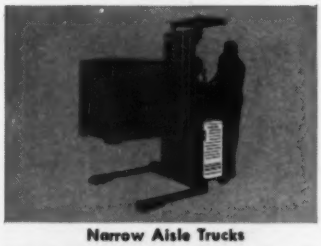
National Foundry Assn. — Annual meeting, Nov. 5-6, Hotel Roosevelt, New York. Association headquarters, 53 W. Jackson Blvd., Chicago 4, Ill.

Metal Treating Institute — Annual meeting, Nov. 5-7, Hotel Sheraton, Chicago. Institute headquarters, 271 North Ave., New Rochelle, N. Y.

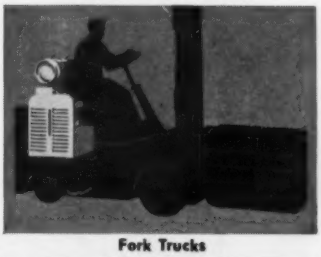
Steel Founders' Society of America (Continued on P. 16)

Complete Range of Ready-Power Units Cuts Ton-Mile Costs for All Types of Electric Trucks

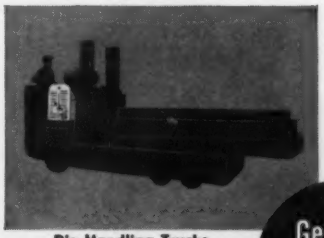
Walkies



Narrow Aisle Trucks



Fork Trucks

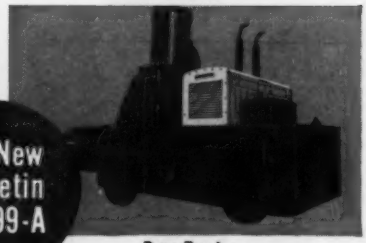


Die Handling Trucks

Gasoline, LP-Gas and Diesel Electric Models Power Trucks from Walkies to Steel Handlers

Ready-Power offers a complete range of power units that increase work output and cut ton-mile costs for all makes and models of electric trucks. Ready-Power units generate electric power on demand. They assure full power at all times, for unlimited periods. Truck slowdown is eliminated. Ready-Power units are easily installed on new or used trucks. Return the coupon below for full information.

The Ready-Power Co.



Ram Trucks

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DETROIT, MICHIGAN · MELROSE PARK, ILLINOIS

EXHIBITS, MEETINGS

(Continued from P. 15)

—Technical & operating conference, Nov. 9-11, Carter Hotel, Cleveland. Society headquarters, 606 Terminal Tower, Cleveland.

Plumbing Brass Institute — Annual meeting, Nov. 9-11, Barbizon Plaza Hotel, New York. Institute headquarters, One Gateway Center, Pittsburgh 22, Pa.

National Electrical Manufacturers Assn.—Annual meeting, Nov. 9-13, Traymore Hotel, Atlantic City, N. J. Association headquarters, 155 E. 44th St., New York 17.

National Assn. of Waste Material Dealers, Inc.—National fall meeting, Nov. 11-15, Diplomat Hotel, Hollywood Beach, Fla. Association headquarters, 271 Madison Ave., New York 16.

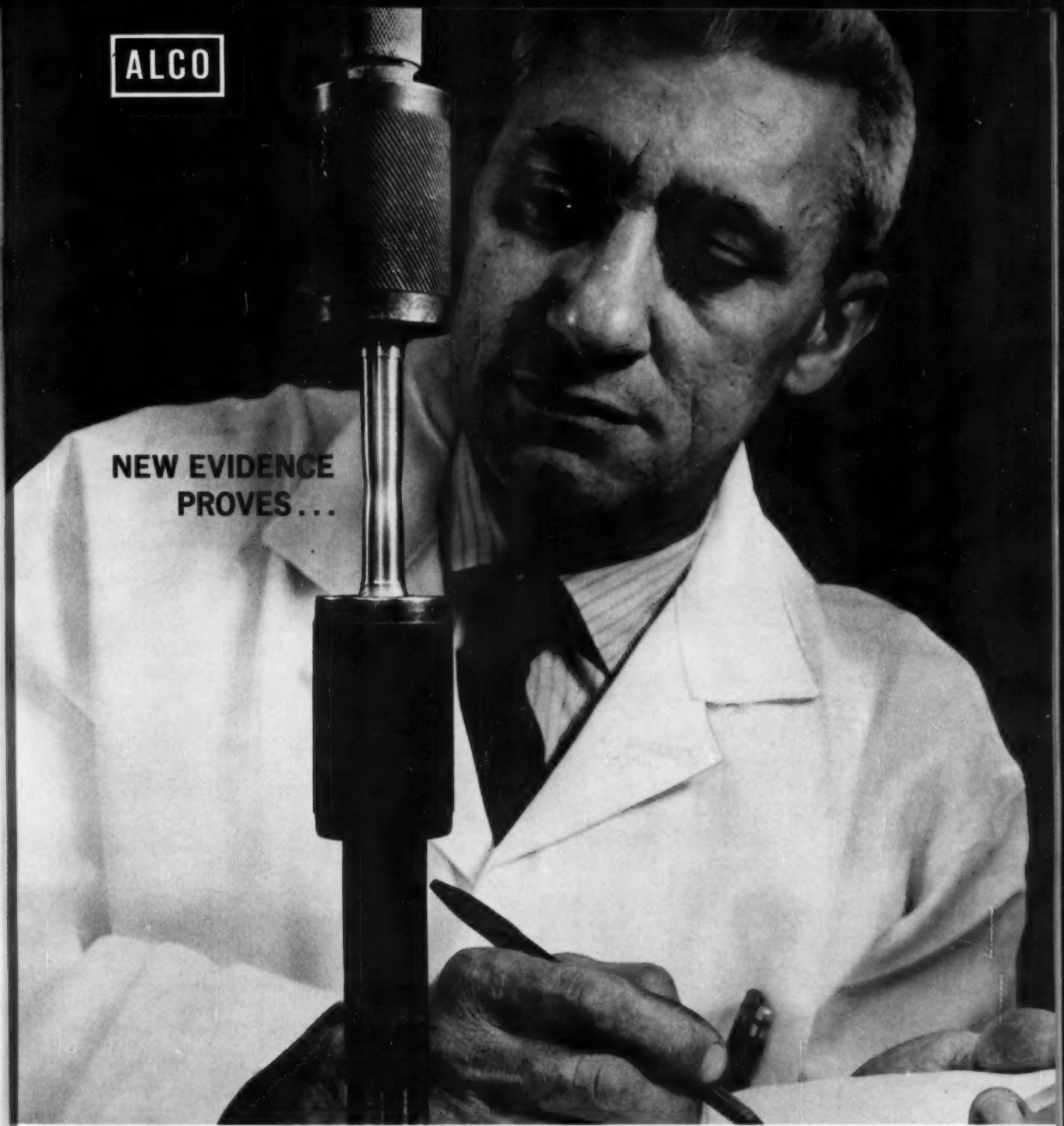
National Screw Machine Products Assn. — Annual fall membership meeting, Nov. 15-19, Americana Hotel, Bal Harbour, Fla. Association headquarters, 2860 E. 130th St. Cleveland.

Aircraft Industries Assn. of America—Annual meeting, Nov. 18-20, Arizona Biltmore Hotel, Phoenix, Ariz. Association headquarters, 610 Shoreham Bldg., Washington 5, D. C.

National Machine Tool Builders' Assn.—Annual meeting, Nov. 19-21, The Greenbrier, White Sulphur Springs, Va. Association headquarters, 2071 E. 102nd St., Cleveland.

The American Society of Mechanical Engineers — Annual meeting, Nov. 29-Dec. 4, Chalfonte Haddon Hall, Atlantic City, N. J. Society headquarters, 29 W. 39th St., New York.

American Institute of Steel Construction, Inc. — Annual convention, Nov. 30-Dec. 3, The Boca Raton Hotel & Club, Boca Raton, Fla. Institute headquarters, 101 Park Ave., New York.



ALCO's Hi-Qua-Led Steel Forgings can raise your profit... without lowering your standards

CONCLUSIVE EVIDENCE:

NO CHANGE IN PROPERTIES with the addition of lead in ALCO's

For the first time, here is published evidence establishing the superiority of one forging steel over all others. The evidence comes from actual production Hi-Qua-Led Steel forgings, tested by ALCO Products, Inc. and confirmed by a variety of customers after extensive value analysis.

The results as reported on these pages prove there are *no significant differences* between the physical properties of ALCO Hi-Qua-Led Steel forgings and unleaded forgings of the same grade. Couple this fact with Hi-Qua-Led's outstanding *machinability* advantages and you have the reasons why ALCO's unique leaded steel is the number one choice for forgings.

The tensile-test data compare physical properties of three steels: AISI 1045, 4140 and 4340, to the same grades (10L45, 41L40 and 43L40) with the ALCO lead addition. They prove that when lead is added by ALCO's special patented process there is no measurable effect upon yield and tensile strengths, and ductility.

Cost-cutting Hi-Qua-Led Steel forgings are available *only* from ALCO, in any steel grade. No other forgings can offer the benefits of Hi-Qua-Led: an increase in your manufacturing profits due to the superior machinability—along with maintenance of your product-quality standards because there is no loss in mechanical properties.

GRADES OF STEEL TESTED
1045 (216 Bhn) **VS.** **10L45*** (225 Bhn)
4140 (260 Bhn) **VS.** **41L40** (270 Bhn)
4340 (285 Bhn) **VS.** **43L40** (292 Bhn)

OTHER TEST RESULTS

FATIGUE STRENGTH—To 340 Brinell, there is no difference in fatigue strength between Hi-Qua-Led Steel forgings and regular forgings of the same grade. Above 340 Brinell, in smooth bar properties, there is a gradual drop-off in Hi-Qua-Led forgings to about 10 per cent at 400 Brinell. In notch-bar properties, there is no difference.

SURFACE FATIGUE—In the AISI 1000 series steels, Hi-Qua-Led Steel forgings have 30 per cent higher resistance to surface fatigue than their non-leaded counterparts. In the 4100 steels, Hi-Qua-Led has a 15 per cent advantage. In the 4300 series, there is no significant difference.

HARDENABILITY—Customers report "no observable difference" and "more uniform hardening and structure" with Hi-Qua-Led Steel forgings.

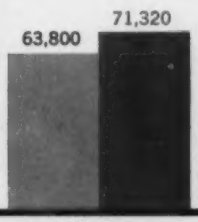
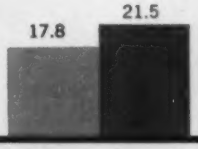
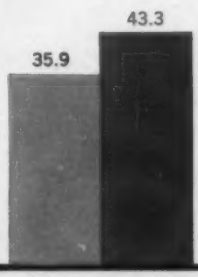
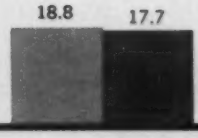
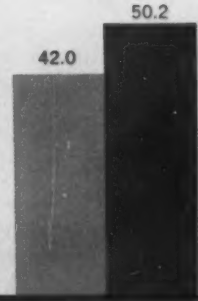
WELDABILITY—There is no difference in the welding of Hi-Qua-Led Steel forgings and regular forgings of the same grade. Hi-Qua-Led is approved for ASME Code welding *(Special Case Ruling No. 1253)*.

CHARPY IMPACT—For 1045 and 4140 series steels, Hi-Qua-Led Steel forgings exhibit better properties than their unleaded counterparts. In 4340, there is no difference between Hi-Qua-Led and regular forgings.

ALCO

EXCEPT BETTER MACHINABILITY

special process Hi-Qua-Led Steel®

TENSILE STRENGTH (psi)	YIELD STRENGTH (psi)	DUCTILITY		RESULTS
		PER CENT ELONGATION	PER CENT RED. OF AREA	
				There is no significant difference between 1045 and 10L45.
				There is no significant difference between 4140 and 41L40.
				There is no significant difference between 4340 and 43L40.

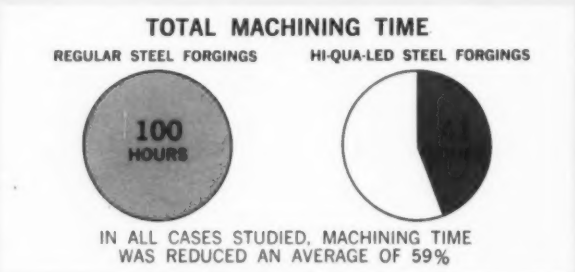
***The "L" designator in any AISI number denotes Hi-Qua-Led Steel. For example, AISI 1045 becomes 10L45 in Hi-Qua-Led Steel.**

For a report on Hi-Qua-Led Steel machinability, turn page . . .

HI-QUA-LED STEEL GIVES YOU MACHINING ADVANTAGES UNMATCHED BY ANY OTHER FREE-MACHINING STEEL

HI-QUA-LED STEEL REDUCES MACHINE TIME MORE THAN 50 PER CENT

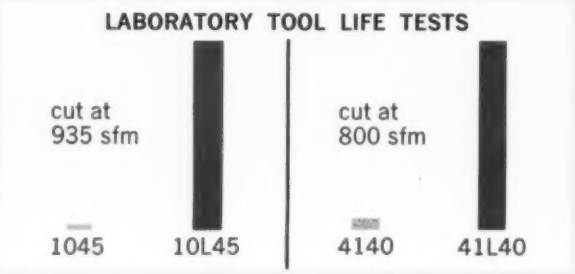
The submicroscopic addition of lead to Hi-Qua-Led Steel changes two basic machining factors. First, the shear angle is increased, reducing the heat generated and the force required for plastic flow. Second, frictional properties of the chip flowing over the tool are reduced, generating less heat and causing less chip welding, and further reducing the force requirement. These changes permit much higher speeds and feeds. Translated into machine time, in most cases they mean more than a 50 per cent saving, floor to floor.



IN ALL CASES STUDIED, MACHINING TIME WAS REDUCED AN AVERAGE OF 59%

HI-QUA-LED STEEL INCREASES TOOL LIFE UP TO 100 TIMES

In laboratory tests by a major tool maker, cutting at 935 sfm, a tool lasted one minute on standard 1045 and 100 minutes on Hi-Qua-Led 10L45 from the same heat. On standard 4140, at 800 sfm, a tool lasted one minute. On Hi-Qua-Led 41L40 from the same heat, at the same surface speed, the tool lasted 18 minutes. Of course, you probably won't cut Hi-Qua-Led at these speeds (although you can). But even at more normal speeds, customers report tool life increases of 200%, 700%, even 1600%.



HI-QUA-LED STEEL FORGINGS ARE MADE ONLY BY ALCO

There are many leaded steels on the market, but there is only one Hi-Qua-Led Steel. It is available only from ALCO, and only in forgings.

You can get Hi-Qua-Led Steel forgings in any steel grade. Each heat of ALCO steel is carefully made in 60-ton open hearths, assuring strict control of steel chemistry to specification.

For complete information on Hi-Qua-Led Steel's machinability and physical characteristics contact the nearest ALCO sales office, or send for the free 40-page reference booklet: "Technical Data, Hi-Qua-Led Steel Forgings." Write to ALCO Products, Inc., Dept. 159, Schenectady 5, N. Y.

SIZES AVAILABLE

Open die forgings—rectangular
Maximum width—48 in.
Maximum height—32 in.
Maximum length—40 ft
Maximum weight—36,000 lb
Minimum weight—1,000 lb

Open die forgings—shafts
Maximum OD—36 in.
Maximum length—40 ft
Maximum weight—36,000 lb
Minimum weight—1,000 lb

Mandrelled ring forgings
Maximum OD—82 in.
Minimum OD—24 in.
Maximum width—60 in.

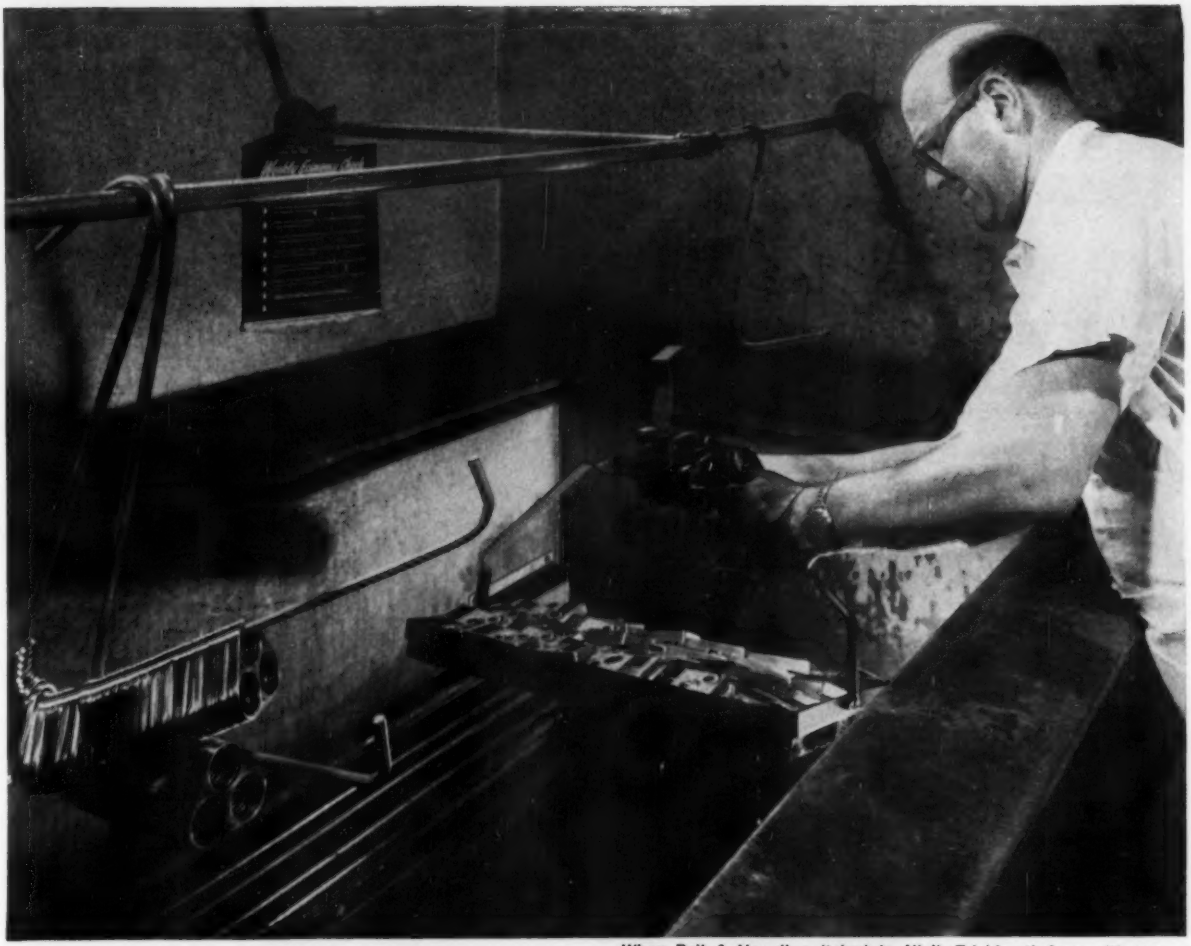
Rolled ring forgings
Maximum OD—160 in.
Minimum OD—18 in.
Maximum width—24 in.

See ALCO's catalog in Sweet's Product Design Catalog File. See Thomas' Register for complete product listings and addresses.

ALCO

ALCO PRODUCTS, INC.
NEW YORK
SALES OFFICES IN PRINCIPAL CITIES

LOCOMOTIVES • DIESEL ENGINES • NUCLEAR REACTORS • SPRINGS • FORGINGS • WELDMENTS • OIL FIELD EQUIPMENT



When Bell & Howell switched to Nialk Trichlorethylene with psp—permanent staying power, it extended clean-outs to a full three months.

How Bell & Howell degreases 390,000 lbs. of metal parts between bath clean-outs

When Bell & Howell switched to a Nialk® Trichlorethylene bath recently, it was found that bath clean-outs could be extended to a full three months.

Previously the bath had to be cleaned *every ten days.*

With the new Nialk bath, Bell & Howell is degreasing 195 tons of small camera and projector parts between clean-outs. The parts are aluminum, brass, steel and zinc and can all be cleaned in the same bath.

The secret is in the stabilizer
The only thing different about the Bell & Howell bath is the Nialk stabilizer. Light, heat, air and acids have no effect on the bath. Even aluminum fines, which can sour trichlor fast, have no effect in the presence of the Nialk stabilizer.

This stabilizer is not extracted by water either; hence all of it is reclaimed during distillation and steam injection. So permanent is the stabilizer that the bath stays fresh and fully protected at all times.

Bell & Howell simply adds more trichlor as drag-out losses lower the bath level; they never have to replenish the stabilizer itself.

FREE BULLETIN • The whole question of stabilizers is so important to anyone concerned with vapor degreasing, we've written a bulletin specifically on the Nialk stabilizer and its advantages. Write for Bulletin 70 if you'd like a copy.

HOOKER CHEMICAL CORPORATION
310 Union Street, Niagara Falls, N. Y.

HOOKER CHEMICALS PLASTICS

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OLDBURY® CHEMICALS
DUREZ® PLASTICS

* *Sales Offices:* Chicago, Ill.; Detroit, Mich.; Los Angeles, Calif.; New York, N. Y.; Niagara Falls, N. Y.; Philadelphia, Pa.; Tacoma, Wash.; Worcester, Mass. *In Canada:* Hooker Chemicals Limited, North Vancouver, B. C.

Automatic Hobbing

The Multicycle versions of the Barber-Colman No. 6-10 and No. 16-16 hobbing machines are designed for maximum production of mass-produced parts or those which are to be changed at relatively frequent intervals. Automatic cycling is combined with easy setup in these standard machines to which standard units are added. These Multicycle machines are not special machines, but the standard units can be used in various combinations to produce your job most efficiently. These machines can also be equipped for automatic loading when desired.

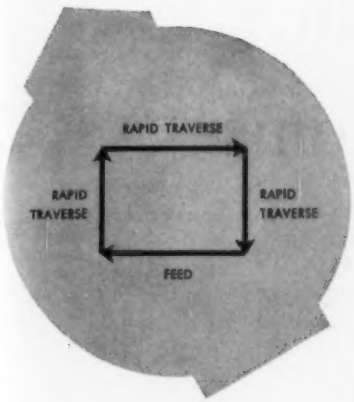
The machine is easily set up for automatic cycling. None of the Barber-Colman versatility is lost. Jobs can be changed as quickly and easily as ever. After the machine has been set up, the operator unloads, loads and presses the start button. Because of the automatic cycling, these machines are equally adaptable and efficient for the mass production of one specific part.

Reduce Approach Time

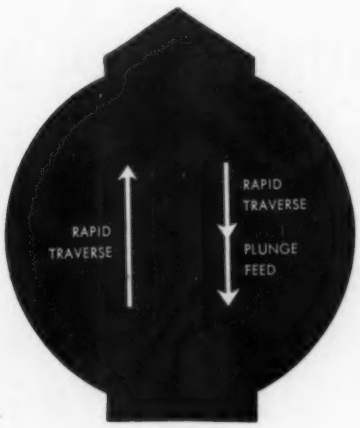
Approach time is often a high percentage of the total time required to produce a gear.

The plunge-approach cycle is designed to reduce approach time to a minimum. The horizontal feed is engaged at the start of the cycle so that the desired helix angle will be cut. The work feeds vertically into the hob until it reaches full depth. The vertical feed changes constantly from a fast feed at the beginning of

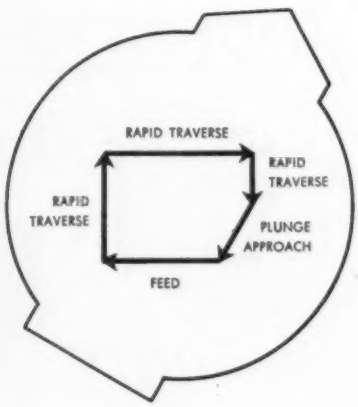
Any one of these automatic cycles can be selected simply by turning a switch on the control panel.



SQUARE CYCLE – automatic version of the conventional hobbing cycle.



PLUNGE CYCLE – automatic vertical feed for cutting worm gears.



PLUNGE-APPROACH CYCLE – combination of "plunge" and "square."

. . . with typical Barber-Colman versatility

the cut to a slow feed as the hob reaches full depth. The vertical feed and rapid traverse are controlled by the vertical feed cam. The rate of vertical feed is infinitely variable.

The plunge-approach cycle allows the use of larger hobs with more flutes or threads without an increase in approach time. More flutes can be used for greater accuracy and higher production, and more threads will normally result in an increase in production. This cycle can be used advantageously for cutting blind worms or blind gears.

Square and Plunge Cycles

These machines can be set up for square cycle with conventional or climb cut in either direction, and for plunge cycle for worm gears. Cycling is completely automatic for both arrangements.

Get Multicycle Production Estimate

Send us your gear prints for a production estimate on a Multicycle machine. Call your nearest Barber-Colman field office or the factory, WO 8-6833.

Barber-Colman Company

BARBER COLMAN

1010 Loomis Street, Rockford, Illinois

Here's what Morse's entry into the "Timing"® Belt field means to you . . .

Nobody gives you a more impartial analysis of your power transmission problems than Morse, because . . . *only Morse* offers all four of these basic drives plus a complete line of power transmission products

Basic Drives: Roller Chain, Silent Chain, Hy-Vo® Drives, and "Timing"® Belt.

Chain: High-Endurance (H-E), 8-series (Super Strength), Double-Pitch, Conveyor, Implement, and Attachment; AL, BL, Cable Chain, and Rollerless Lift Chain; Industrial Standard and 3/16″ Silent Chain.

Stock Sprockets: Plain Bore, Finished Bore, Taper-Lock—also made to order.

"Timing" Belt Sprockets: Plain Bore, Taper-Lock, Q.D.—also made to order.

Couplings: Flexible Roller Chain Couplings, Flexible Silent Chain Couplings, Morflex Couplings, Morflex Radial Couplings, and Marine Couplings.

Driveshafts: Morflex and Radial Driveshafts.

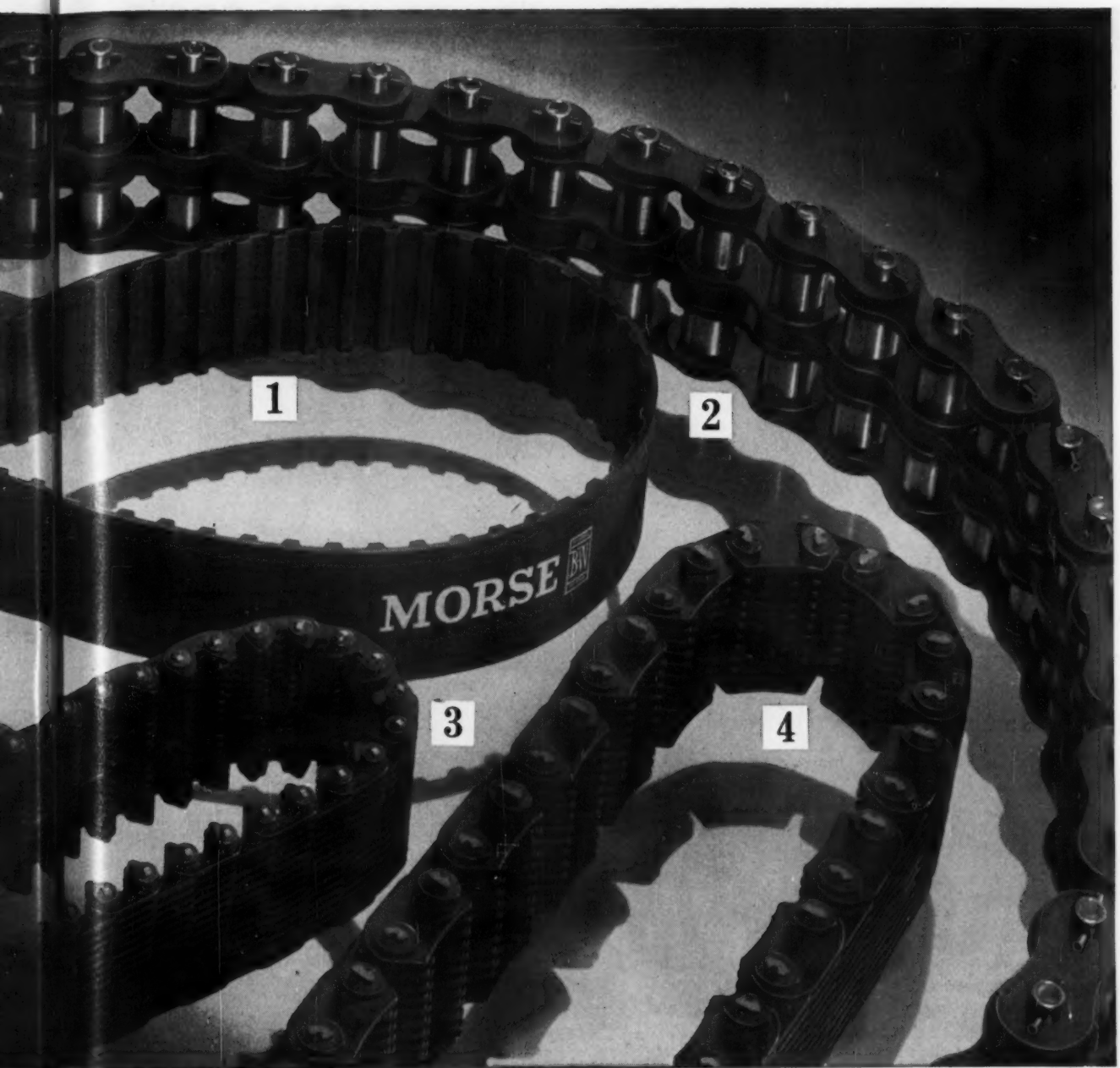
Clutches: Cam (Over-Running, Back-Stopping, Indexing); Pullmore; Over-Center, Centrifugal.

Speed Reducers: Eberhardt-Denver "RW" poweR-gear® Reducers; Gear Motors; "L" Worm Gear Reducers; "VX" and "DVX" Conveyor Drives; Miter Boxes; Helical Reducers.

Torque Limiters.

Look for your local Morse distributor in the Yellow Pages under "Power Transmission," or write:

MORSE CHAIN COMPANY, Dept. 33-109, ITHACA, NEW YORK. Export Sales: Borg-Warner International, Chicago 3, Ill. In Canada: Morse Chain of Canada, Ltd., Simcoe, Ontario



1. "Timing" Belt . . . for light weight and lubrication-free operation. Morse "Timing" Belts give positive, high-efficiency transmission from 0 to 16,000 FPM, 1/100 HP to 1,000 HP . . . provide slip- and stretch-proof service for life of drive.

2. Roller Chain . . . for low and medium speed applications. Precision-finished Morse Roller Chain is specially treated to withstand shock and fatigue, assure less maintenance, longer service life. Patented Spirol Pin Fastener construction.

3. Silent Chain . . . for smoother, quieter operation at higher speeds. In Morse Silent Chain the patented rocker joint operates with less friction and wear. It provides a cooler-running chain drive, with higher efficiency and longer service life.

4. Hy-Vo Drive . . . for extremely high speeds and horsepower. Exclusive with Morse, extra-tough Hy-Vo Drives transmit mile-a-minute speeds, and up to 5,000 hp loads; require minimum shaft space, usually eliminate outboard bearings.

REMEMBER: The toughest jobs in power transmission come to Morse, because *only Morse* offers one-source service on all four of these basic components . . . and backs them up with technical know-how based on over 60 years' experience solving power transmission problems.

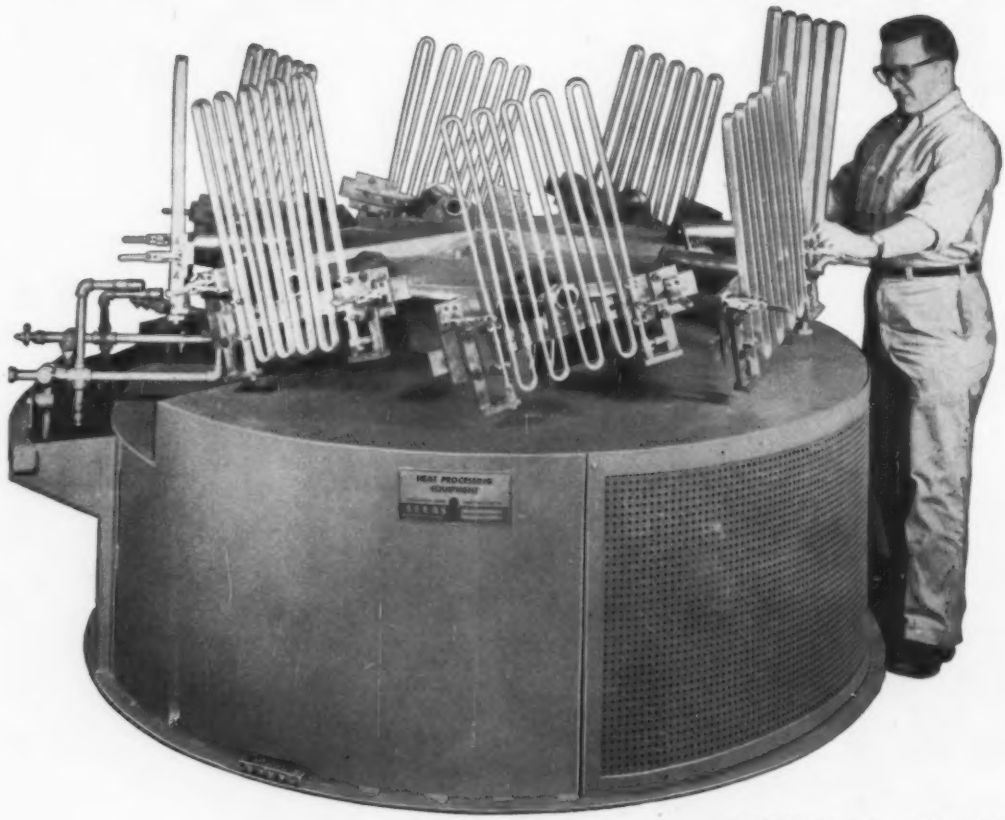
MORSE

MORSE B-W BORG-WARNER

*Trademark

A BORG-WARNER INDUSTRY

IMPROVE YOUR PRODUCT... LOWER YOUR COSTS
...with Selas Automatic Heat Processing



BRAZING: Manufacturer of air-conditioning equipment gets consistently high quality return bends with this custom-built Selas automatic brazing machine. Occupying floor space of only 6 ft x 6 ft, the compact machine simultaneously brazes an aluminum fitting onto each end of an aluminum serpentine coil, at production rate of 130 assemblies per hr. Fixtures are readily interchangeable to accommodate various workpiece sizes. Machine is designed and built to meet changing heat cycles and production demands. Labor cost reduced over hand-torch brazing method previously used.

Selas automatic machines are extensively used for production heat processing operations, including annealing, heat treating, brazing and soldering, forging and localized hardening.

The installations shown on these pages demonstrate how Selas automatic heat processing equipment can:

- increase production speed
- save fuel and operating costs
- minimize in-process inventory
- reduce manpower requirements
- save valuable floor space
- improve product quality

Individually designed and custom-built to meet your specific production requirements and job specifications, Selas automatic machines employ time-proven standardized engineering features for longtime operating dependability and minimum initial cost. In addition, you avoid problems usually associated with divided responsibility since Selas starts-up and services every machine it designs and builds.

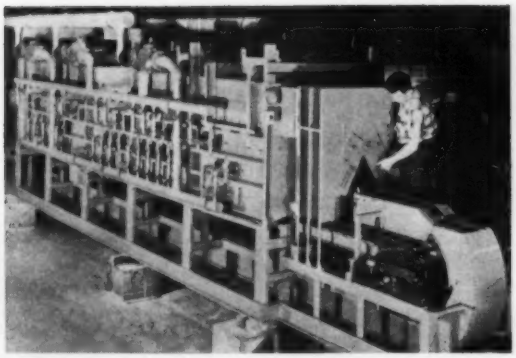
A Selas automatic machine can prove beneficial in your plant. At your convenience . . without cost or obligation to you . . a Selas field engineer would welcome the opportunity to survey your needs.

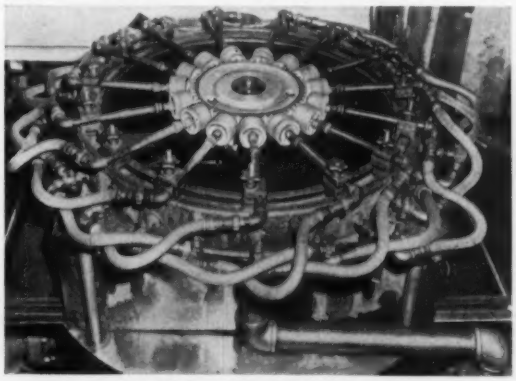
For this personal service—or for literature on any of the heating operations shown on these pages—write to Mr. W. B. Troupe, Asst. Mgr., General Industry Div., Selas Corporation of America, Dresher, Pa.

Duradiant and Gradiation are registered trade names of Selas Corporation of America

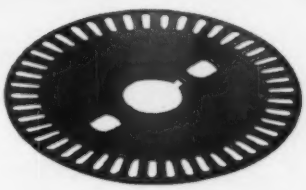
SUBSIDIARIES: Selas Constructors, Inc., Houston, Texas; Selas Corporation of America, European Div., S. A., Pregny, Geneva, Switzerland.
INTERNATIONAL REPRESENTATIVES AND LICENSEES: CAMBODIA, FORMOSA, KOREA, LAOS, VIETNAM—Cosa Export Co., Inc.; AUSTRIA, GERMANY—Indugas, Essen; JAPAN—International Machine Co., Ltd., Tokyo; ITALY—Italiana Gasogeni E. Forni S.r.l., Milano.

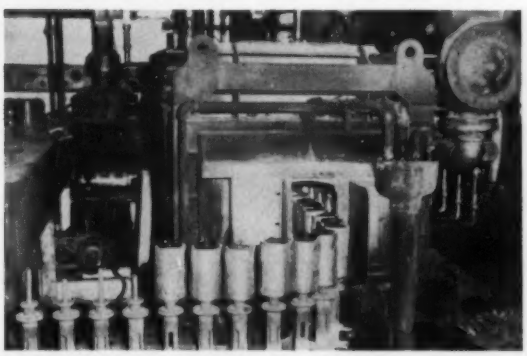
HEATING FOR FORGING: This Selas automatic machine heats arrowhead-shaped cultivator sweep blanks, for subsequent forging and bending, at the rapid rate of 1200 per hr, reducing fuel requirements 65% and synchronizing the heating operation with other production-line processes. The sweep blanks are conveyed point-up through the narrow heating chamber, with strategically-located Duradiant® burners firing on them from both sides at close range. Close proximity of the direct-fired burners to the workpieces makes it possible to achieve the variable temperature pattern required for the hot forming operations, in less than 3 min.



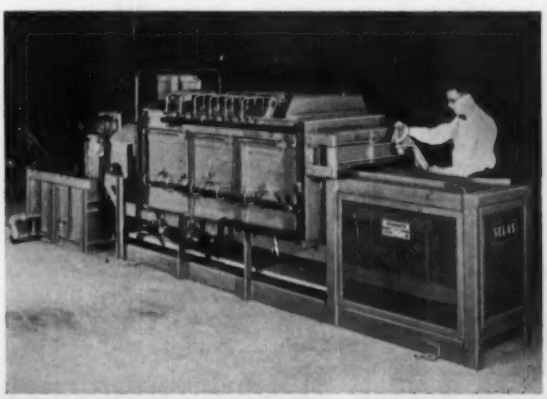


SELECTIVE HARDENING: Gradiation® heating provides rapid heat transfer rate without flame impingement in this flame-hardening unit which heat treats teeth of large gears used in tractor-mounted towing winches. Selas heating reproduces controlled hardness pattern from tooth to tooth, gear to gear. Gear blanks can be machined in normalized and tempered condition (Bhn 180-220), saving 27% in overall machining time. Strength, wear resistance, toughness are improved, permitting up to 20% reduction in gear face width. Speed and controllability of heating permit use of C1046 carbon steel instead of previously-required alloy steel.





ANNEALING: Electric motor stator and rotor laminations are annealed in this Selas Gradiation automatic machine to develop required electrical characteristics. Laminations, 2½ in. to 10 in. O.D., stacked 6 in. high on spindle fixtures, are carried through Duradiant-burner-fired heating tunnel, then through water-jacketed chamber for controlled cooling. Entire annealing cycle takes only 35 min, extremely fast compared with conventional methods. Interchangeable fixtures permit accommodation of wide range of stator lamination stacks, rotor lamination stacks, as well as stators and rotors in finished form.

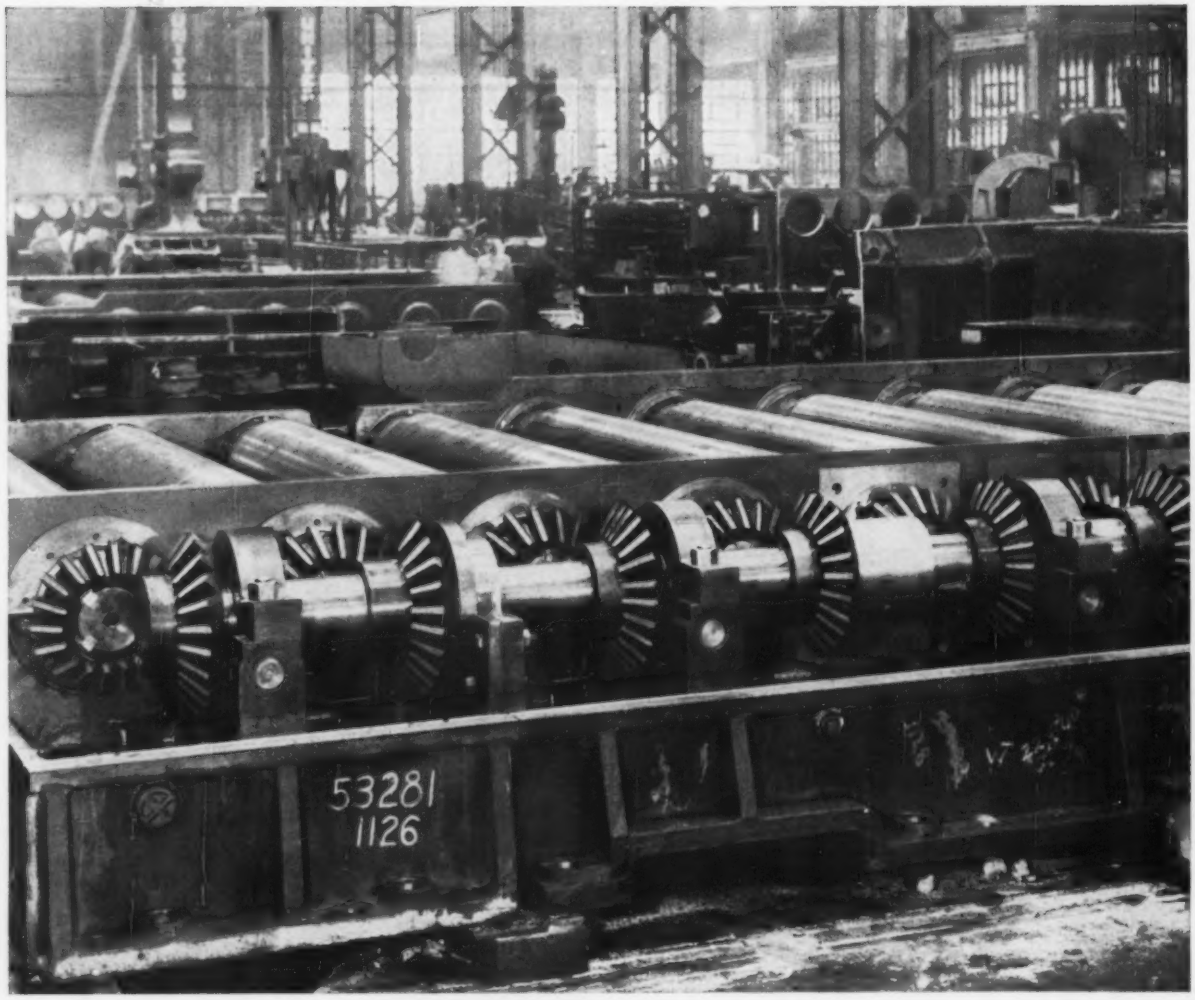


HEAT TREATING: Compact, automatic, conveyorized Selas machine heat treats electric motor shells, pole pieces and other small metal parts . . . at rate of 900 lb of parts per hr. Uniform heating assured by Duradiant burners in side-walls above and below conveyor belt, improves magnetic properties of shells; produces a tight, thin, oxide surface to which finishing paint adheres for a lasting finish. After heating to 1400°-1500°F, motor parts pass through controlled cooling cycle in an atmosphere of combusted gases, followed by quench in corrosion-inhibiting media.

SELAS *Heat and Fluid Processing Engineers*

CORPORATION OF AMERICA
DRESHER PENNSYLVANIA

DEVELOPMENT · DESIGN · CONSTRUCTION



The AISI 4340 steel in these gears gives you strength, toughness, and reliability. It's readily annealed, yet it can be machined at fairly high hardness levels. It welds easily with appropriate procedures and responds reliably to heat treatment.

Gears of 4340 Nickel alloy steel keep slabbing mills rolling . . . dependably

How well do heavy-duty gears of 4340 Nickel alloy steel perform?

United Engineering and Foundry Company reports, "4340 Nickel-alloyed steel mill gears are still on the job after three years' service."

You can expect maximum performance from 4340 through-hardening steel because of its excellent combination of strength and toughness when properly heat treated. Its high hardenability insures uniform properties in parts like gears which have different section sizes.

4340 through-hardening Nickel alloy steel may be the answer to your own parts problem where moderate-to-heavy sections are involved. You'll find this steel easy to process and readily available from Steel Service Centers throughout the country.

Technical information on 4340 and other Nickel-alloyed steels is readily available, too. Just ask us for the facts you want.

The INTERNATIONAL NICKEL COMPANY, Inc.
67 Wall Street INCO New York 5, N. Y.

INCO NICKEL

NICKEL MAKES ALLOYS PERFORM BETTER LONGER

UNITED®

4-HIGH 2-STAND TANDEM TEMPER PASS MILL

UNITED

ENGINEERING AND FOUNDRY COMPANY

PITTSBURGH, PENNSYLVANIA

Plants at Pittsburgh, Vandergrift, Youngstown, Canton, Wilmington

SUBSIDIARIES: Adamson United Company, Akron, Ohio
Stedman Foundry and Machine Co., Inc., Aurora, Indiana

Designer and Builders of Ferrous and Nonferrous Rolling Mills, Mill Rolls, Auxiliary Mill and Processing Equipment, Presses and other heavy machinery. Manufacturers of Iron, Nodular Iron and Steel Castings and Weldments.

Man's Eternal Struggle with the Machine

COMPETITIVE PRESSURES AND RISING COSTS DEMAND GREATER PRODUCTION EFFICIENCY THAN EVER BEFORE

How do you know you're making your product right?

Rather curious question, isn't it! But before you laugh it off, take a good look at what's happening on your production line. There's more processes using manufacturers than there are manufacturers using processes.

What you're looking for is efficiency. Lack of it costs money. The kind *you* pay in overhead, competitive advantage, rejects, rework operations, etc.

For example—consider your resistance welding . . .

How many spot welds are you using to assemble the piece parts of your product? . . . as many as will fit in the space? . . . enough to "be sure" it will hold? . . . or as many as *really required!* No matter how you figure it, the first two cost too much money. Because they require either too much equipment or too much time. Usually both!

Many manufacturers use resistance welding for speed. Weld integrity (which, incidentally, does not necessarily penalize speed) is often overlooked. In order to make up for lack of weld quality, more welds are used. But fifty poor welds aren't any better than fifteen poor welds. They just cost more. Particularly when five *welds of suitable quality* will do the job!

Sciaky knows that weld efficiency is a matter of combining quality with speed. That's why Sciaky equipment is precise enough to produce consistently. Once suitable quality is established, you can depend on it throughout the toughest production conditions.

Why take less than the full advantage of consulting with a Sciaky Application Engineer the next time you're considering equipment. No obligation, of course.

The manufacturers of automobile wheels took that advantage. As a result those wheels are now being assembled with eight suitable quality welds instead of twelve rivets. Automatically. Four other operations have even been included. As a result, the wheels are better, and made faster at lower cost.

SCIAKY

74A

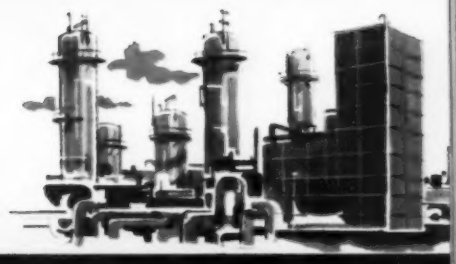
SCIAKY BROS., INC., 4923 W. 67th STREET, CHICAGO 38, ILLINOIS • POrtsmouth 7-5600

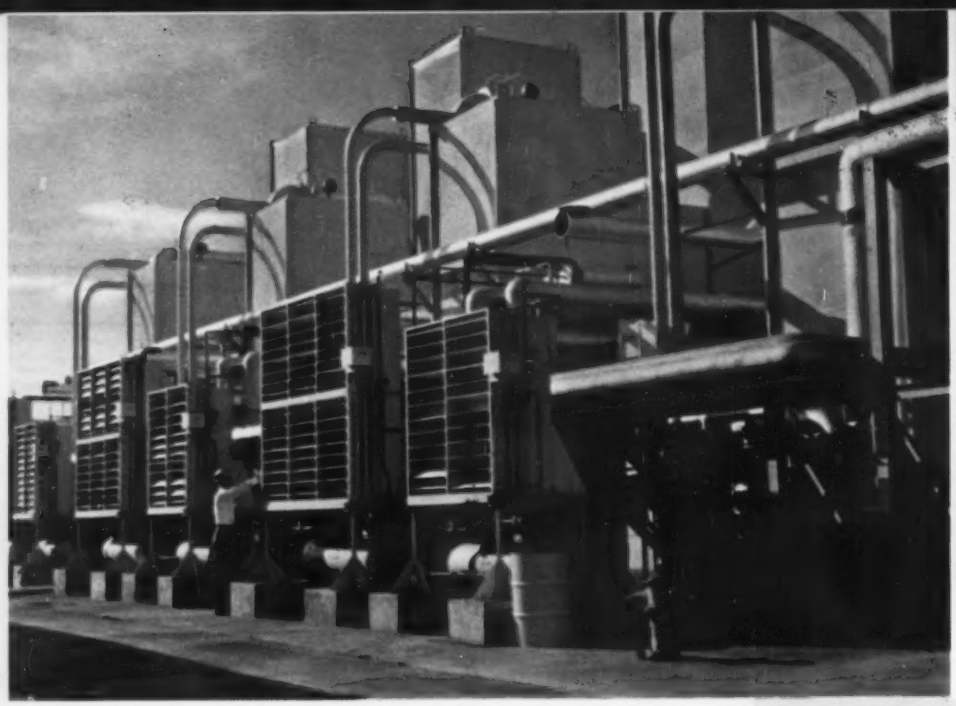
Perhaps you, too, can profit from

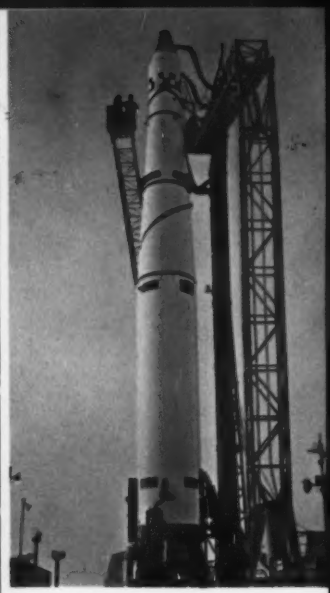
Air Products
...INCORPORATED

CAPACITY

... capacity to design, produce, install and operate *complete systems* for separation, purification and liquefaction of gases – systems that provide profitable advantages and opportunities throughout industry.







Liquefied gases from Air Products equipment supply all major U.S. missiles.

HOW THE MILITARY SERVICES use Air Products CAPACITY

Large-scale low-temperature systems, ultra pure gases and liquids, and a broad range of specialized cryogenic "hardware" are supplied by Air Products to the military. When large quantities of liquefied gases were needed for rocket engine development and missile testing, Air Products quickly designed, manufactured and put on stream complete production facilities. Typical facilities paid for themselves in less than a year's time. Air Products also provides a broad line of portable air separators for field and shipboard use . . . and has advanced the development of exotic fuels. And, Air Products produces advanced design liquefied-gas pumps, cryogenic storage and transfer systems, electronic cooling devices and refrigeration and distillation equipment for military uses.

YOU will find here tangible evidence of a growing technology. Applying "Cryogenics" (the science of low temperatures) and engineering broad new routes to low-cost, high-purity industrial gases is the main business of Air Products.

Air Products combines original research knowledge with engineering and manufacturing capabilities and substantial operating experience. These integrated activities have

These companies and many others are the beneficiaries of major facilities provided by Air Products:
Acme Steel • Bethlehem Steel • Brazilian National Steel • Celanese • Dow Chemical • du Pont • Grace Chemical • Great Lakes Steel

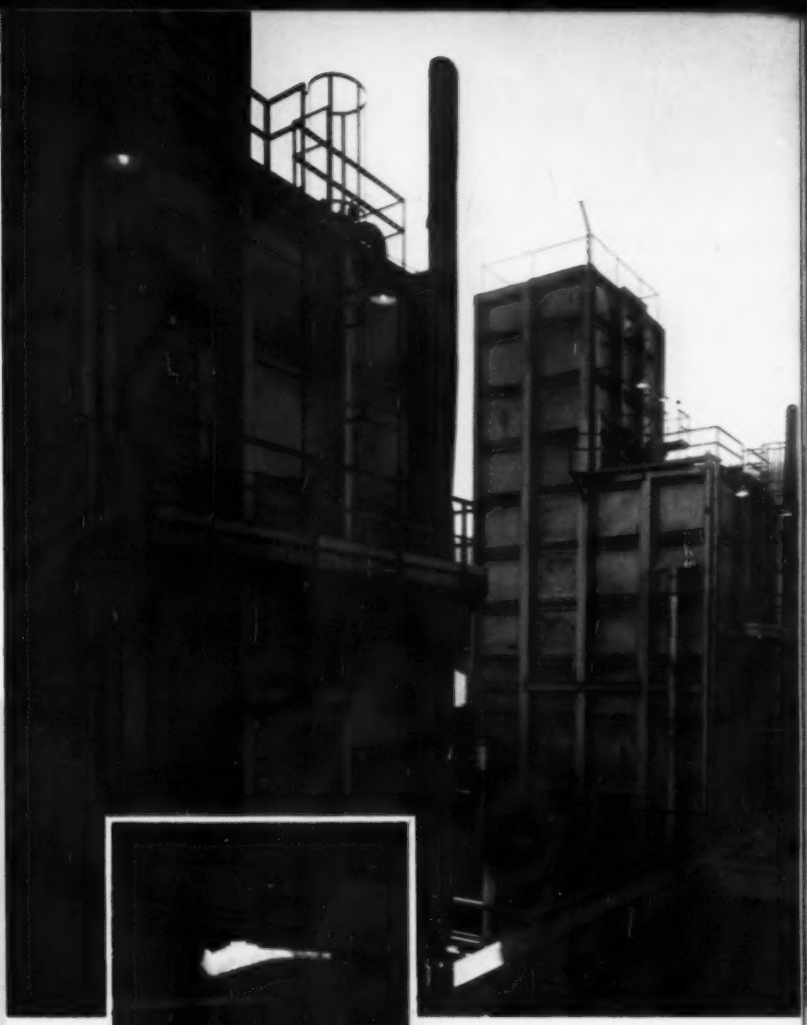
Petrochemical plants use Air Products equipment in feedstock preparation and product purification.

HOW THE STEEL INDUSTRY uses Air Products CAPACITY

In the blast furnace, the open hearth and the new converter processes — Air Products oxygen efficiently increases steel mill capacity. Annealing nitrogen and other gases are also provided on a low-cost tonnage basis.

Air Products' complete gas supply systems are installed at steel mills without capital investment or operating worries on the part of the users. Continuity and reliability of supply are assured. On-site facilities pioneered by Air Products reduced the cost of oxygen 80% in 12 years — transforming oxygen from a costly chemical to a practical working utility.

Further progress marks on-the-job development work now continuing around the clock at major steel making facilities. Entirely new metallurgical techniques . . . and new profits . . . are available through Air Products.



Air Products pipeline oxygen serves the Basic Oxygen Furnace Process.

have provided many Air Products customers with distinct competitive advantages.

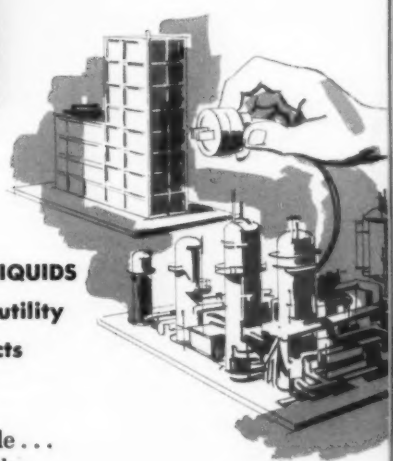
Air Products is the world's leader in APPLIED CRYOGENICS — the practical and profitable use of low-temperature science for industry.

Perhaps this CAPACITY can help solve your problems — in cryogenics, in industrial gas supply systems, or in some new area where "sound rules" are yet to be established.

Jones & Laughlin Steel • Osaka Oxygen • Spencer Chemical • Sun Oil • U.S. Government—All major research and defense projects • United States Steel • Venezuelan Ministry of Mines • Weirton Steel.

HOW THE CHEMICAL INDUSTRY uses Air Products CAPACITY

Air Products low-temperature systems permit many modern chemical plants to improve operating efficiency and end-product quality — and to develop new processes and products. This results from the ready availability of low-cost tonnage quantities of oxygen, nitrogen, hydrogen, ammonia and methanol syn-gas, carbon monoxide and hydrocarbons such as purified methane, acetylene and ethylene. Low-temperature separations of gaseous mixtures now make it practical to recover valuable components from natural gas, refinery off-gases, coke-oven gas and other "waste" gases. The versatility of cryogenics—as applied by Air Products—works profitably for the chemical industry today . . . offers unparalleled future opportunity in this fast-growing industry.

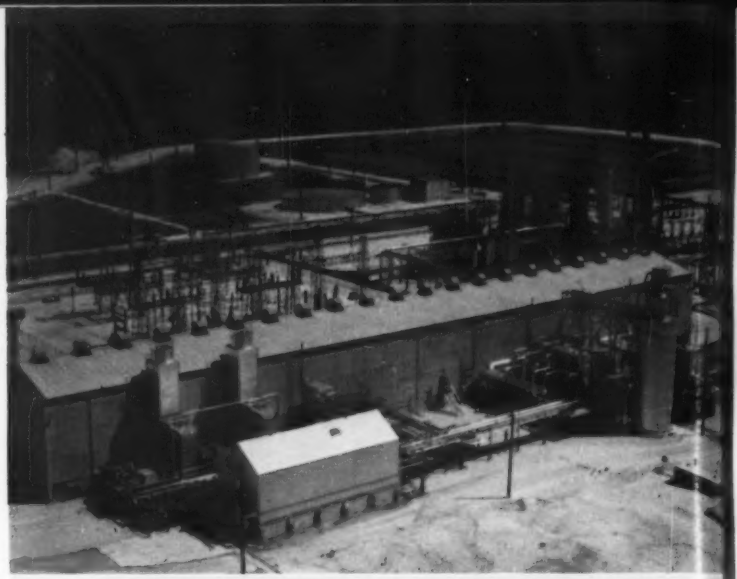


HIGH PURITY GASES AND LIQUIDS —available like any other utility with the help of Air Products CAPACITY

. . . The supply is dependable . . . the price guaranteed . . . with Air Products on the job.

Air Products
. . . INCORPORATED

"ULTIMATE" FUEL ON TONNAGE SCALE
... from pilot operation to tonnage production through Air Products CAPACITY



Liquid hydrogen, identified by the Air Force as an "ultimate" chemical fuel with three times the energy content of present fuels, is in production at this facility in Palm Beach County, Florida. Built and operated for the Air Force by Air Products.

Perhaps you, too, can profit from

Air Products CAPACITY*

* To find the new opportunities Applied Cryogenics may offer in the manufacture, separation and purification of Industrial Gases.

* To provide integrated research, engineering, manufacture and operation...complete services under a single responsibility.

* To forecast accurately and guarantee total cost, superior performance and reliability.

* To put entire gas supply complexes to work for you *without capital investment on your part.*

Air Products CAPACITY has helped our customers to step out ahead of competition in familiar fields... to open up entirely new areas of opportunity through new products or processes. A letter or telephone call will put Air Products CAPACITY to work for you.

Air Products
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ALLENTOWN, PENNSYLVANIA

Information is available on: superconductivity • frozen free radicals • biological preservation • environmental control • low temperature catalytic reactions • infrared detection • masers • purification and liquefaction of: argon • carbon monoxide • ethylene • fluorine • helium • hydrogen krypton • methane • neon • nitrogen • nitrogen trifluoride • oxygen • oxygen difluoride • ozone • xenon

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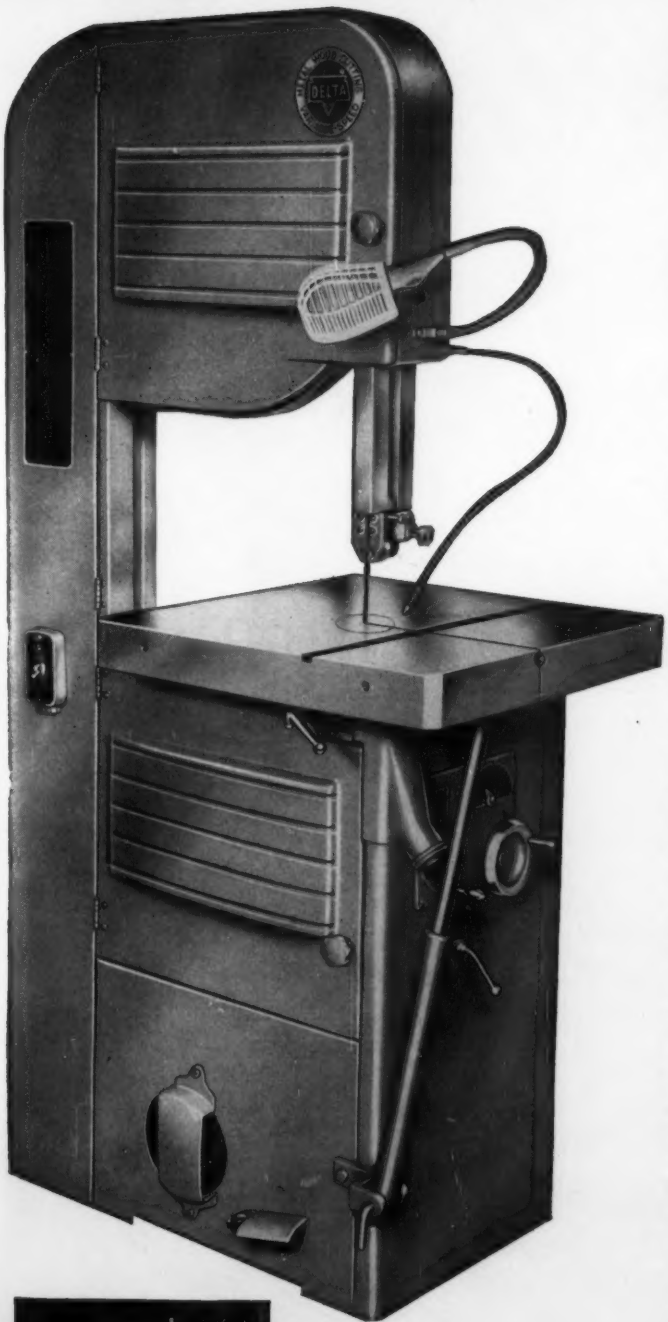
NEW from DELTA



20" metal-wood *variable speed* BAND SAW

No matter what your cutting requirements —in the foundry, toolroom or pattern shop —this all-new Delta 20" Metal-Wood Band Saw gives you real on-the-job performance. Now—*for less than $900.00*—you can have the features you said you wanted most for greater accuracy and better cutting:

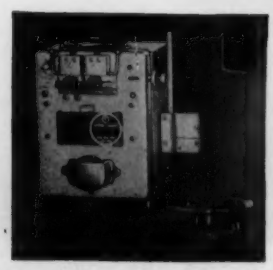
WIDE RANGE VARIABLE SPEED DRIVE . . . gives you a tremendous speed range—50 to 4500 FPM—for cutting everything from stainless steel to aluminum, wood and plastics. This versatility can't be equalled.

SCIENTIFICALLY DESIGNED BLADE GUIDES . . . ideal for heavy metal cutting because they furnish more "close up" blade support than conventional type guides. These new Delta blade guides are the key to better accuracy, straighter cuts, and longer blade life.

RUGGED FRAME CONSTRUCTION . . . features a massive, rigid internal frame with a modern fabricated exterior. Exclusive 3-point adjustability (wheels, upper guide and table) assures perfect alignment of key components.

In addition to these outstanding features you get a massive table with double trunnion support, convenient speed controls, plus built in chip blower *at no extra cost.*

SEE IT AT YOUR NEAREST DELTA DEALER— he's listed under "TOOLS" in the Yellow Pages—or write: Rockwell Manufacturing Company, Delta Power Tool Division, 640K N. Lexington Avenue, Pittsburgh 8, Pa.

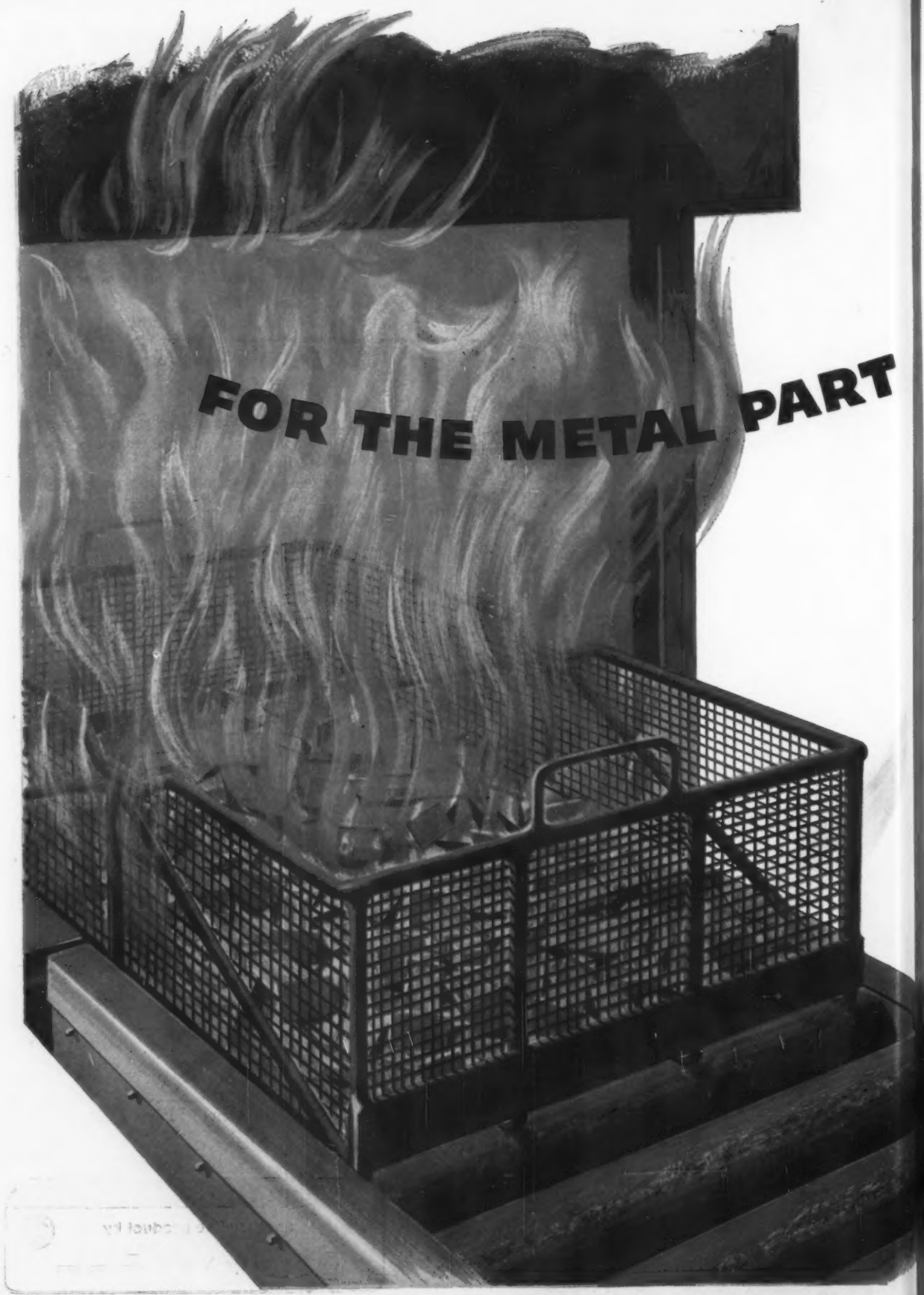


BLADE WELDER, including shear and grinder, shown on No. 28-462. Bracket mounted on 20" Band Saw for machine-side use. (Optional accessories)

DELTA INDUSTRIAL TOOLS

another fine product by

ROCKWELL


FOR THE METAL PART

THAT TAKES THE BEATING

Three years' operation at temperatures ranging from 1450 deg. F. to 2040 deg. F.! That's the record of a tray made of HASTELLOY alloy X, used for holding parts in a heat-treating furnace during hardening, gas carburizing, or gas carbonitriding. After the heat-treating cycle, parts are plunged into an oil quench—still in the tough tray.

If you are looking for a metal for machinery parts that have to withstand heat, corrosion, wear—investigate HAYNES alloys. There are more than 15 to choose from, including HAYNES STELLITE cobalt-base alloys, HAYNES iron-base alloys, HAYSTELLITE cast tungsten carbide, and HASTELLOY nickel-base alloys. They are available as castings, forgings, completely fabricated parts, or as sheet and bar stock. All parts can be furnished machined or ground to specified size and finish.

HAYNES Alloys *will do the job!*

HAYNES ALLOYS

HAYNES STELLITE COMPANY

Division of Union Carbide Corporation

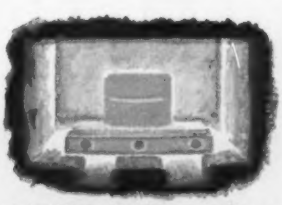
Kokomo, Indiana

UNION CARBIDE

Address inquiries to Haynes Stellite Company, 420 Lexington Avenue, New York 17, N. Y.

The terms "Haynes," "Haynes Stellite," "Hastelloy," "Haystellite," and "Union Carbide" are registered trade-marks of Union Carbide Corporation.

TYPICAL "HAYNES" ALLOY HEAT-RESISTANT PARTS



GRID TRAY of HASTELLOY alloy X holds bits during bonding of diamonds to drill bit face. Furnace heat is 2300 deg. F. in 1½-hour cycles. The trays withstand over 100 such cycles.

FURNACE DOOR HANGERS of HASTELLOY alloy X, exposed to 2000 deg. F. flames in either oxidizing or reducing atmospheres, have served over a year. Steel failed in three weeks.

HEARTH PLATES and hanger bolts of HASTELLOY alloy X are in their second year of service in electric furnaces that reach 1950 deg. F.—resisting oxidation, thermal shock, heavy loads.

"Build us a plant,". . . we said, "to step up spring service to the mid-continent"

and here it is . . .

newest, most modern springmaking plant in the world

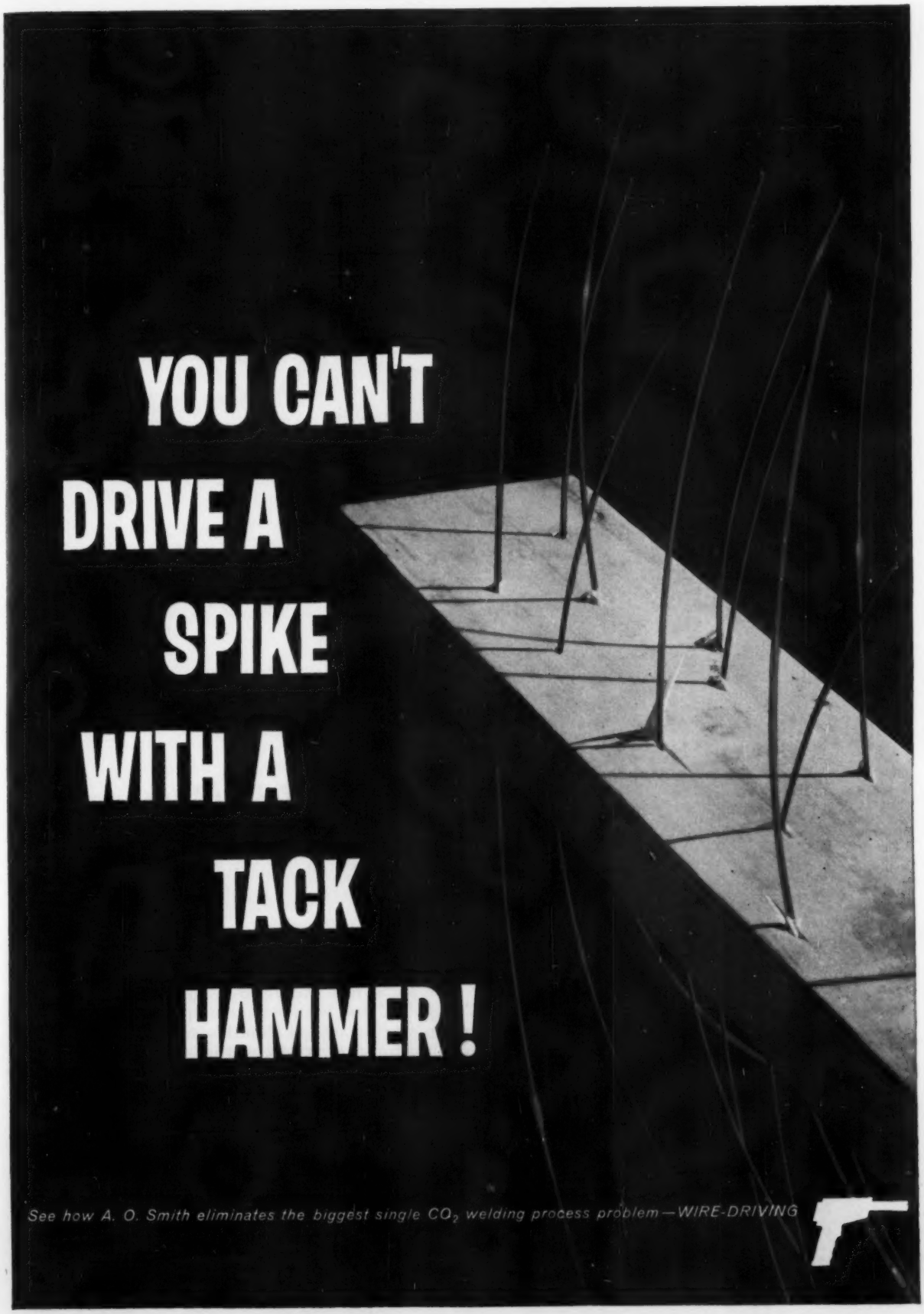
Ground broken in June . . . now beginning operation . . . this modern plant of our Gibson Division means improved quality, production efficiency and customer service — the prime objectives of Associated Spring Corporation. In the mid-continent region, for example, we now provide in addition to this plant, a new sales and engineering office in Chicago, plus expanded operations in the Milwaukee Division.

Here is further evidence of adapting to needs of industrial markets—already demonstrated in the strategic location of other Associated Spring Divisions and sales offices throughout the United States, Canada and Puerto Rico. It's also assurance of progress, stability, and responsibility that you expect from the leader in precision mechanical springs and small stampings.

5912

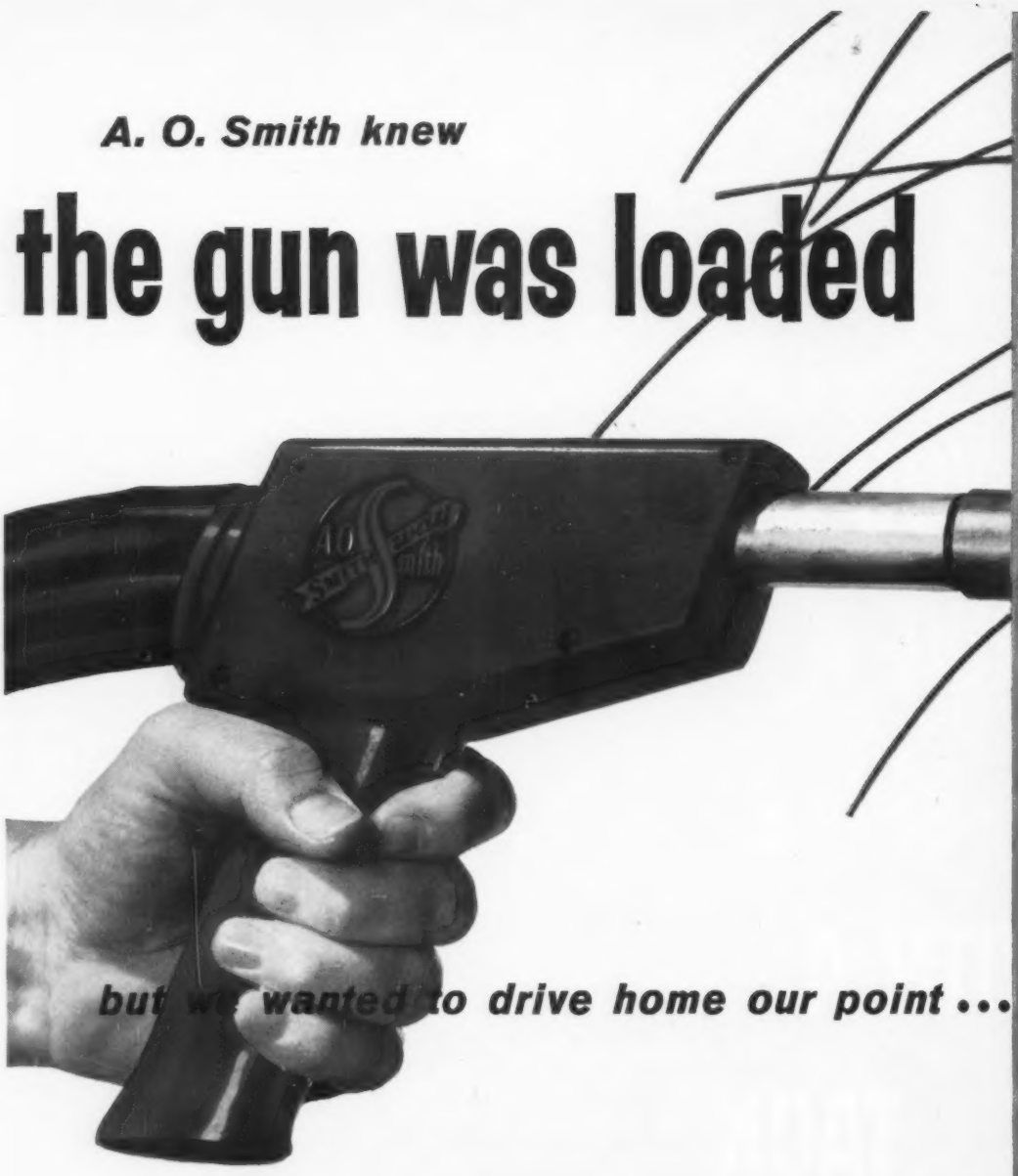
Associated Spring Corporation **General Offices: Bristol, Connecticut**

Wallace Barnes Division, Bristol, Conn. and Syracuse, N. Y.
Gibson Division, Mattoon, Ill.
Chicago Sales Office, Chicago, Ill.
Milwaukee Division, Milwaukee, Wis.
Ohio Division, Dayton, Ohio
Raymond Manufacturing Division, Corry, Penna.
Cleveland Sales Office, Cleveland, Ohio
Seaboard Pacific Division, Gardena, Calif.
San Francisco Sales Office, Saratoga, Calif.
B-G-R Division, Plymouth and Ann Arbor, Mich.
F. N. Manross and Sons Division, Bristol, Conn.
Dunbar Brothers Division, Bristol, Conn.
Wallace Barnes Steel Division, Bristol, Conn.
Subsidiaries—Wallace Barnes Co., Ltd., Hamilton, Ont. and Montreal, Que.
Associated Spring of Puerto Rico, Inc., Carolina, P.R.


YOU CAN'T
DRIVE A
SPIKE
WITH A
TACK
HAMMER !
See how A. O. Smith eliminates the biggest single CO_2 welding process problem—WIRE-DRIVING

A. O. Smith knew

the gun was loaded



but we wanted to drive home our point . . .

that A. O. Smith automatic and semi-automatic welding equipment has more wire-driving "beef" than any other system in the field.

We drew a bead on a slab of wood with an A. O. Smith C-OMANUAL hand gun. The results were amazing — even to us. As you can see in the photograph, standard 1/16" diameter welding wire smashed completely through.

The same test was tried using the C-OMATIC unit with even more penetrating results. A. O. Smith's tested combination of control and wire-feeding system coupled with bonus horsepower drove the wire through an even thicker piece of wood. Positive proof of performance.

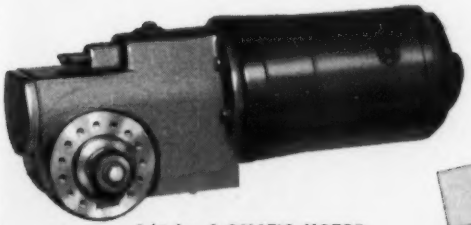
Try this convincing test at the National Metal Show — Booth No. 1446.

MADE BY WELDERS FOR WELDERS . . .

What does this test mean to you?

Just this! The same explosive power gets welding wire smoothly through the automatic head or hand gun. Let's face it. It is the inability of most CO_2 equipment to keep wire feeding continuously without lags and slowdowns that is causing the most trouble along production lines. A. O. Smith has met the problem with more *horsepower* — the biggest, huskiest, most powerful motor on *any* automatic or semi-automatic welding equipment.

1/5 hp C-OMANUAL MOTOR

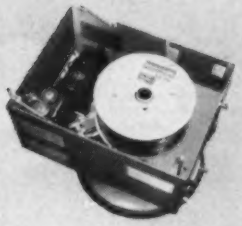


1/6 hp C-OMATIC MOTOR

MORE POWER — C-OMANUAL's big, rugged motor develops 1/5 hp as compared to only 1/12 and 1/10 hp on competitive semi-automatic equipment. Exclusive features include thermal overload protection and special oversized brushes. C-OMATIC's head and drive rolls deliver motor's full 1/6 hp with an exclusive 2-speed shift lever gear box providing low speed, high torque advantage.

• WELDING IS OUR BUSINESS!

A. O. Smith has licked the small problems too!



MAINTENANCE PROBLEMS
Speed control on C-OMANUAL is mechanical. Can be serviced by your regular shop electricians.

GUN LEAKAGE PROBLEMS
A. O. Smith's cooler-operating, water-cooled hand gun drastically reduces spatter pickup and has no "O" rings. Water leakage has been completely eliminated.

ARC CONTROL PROBLEMS
Modern applications of the automatic or semi-automatic process require a range from over 40 to less than 20 volts. Only A. O. Smith gives such wide range plus the arc control features shown below.

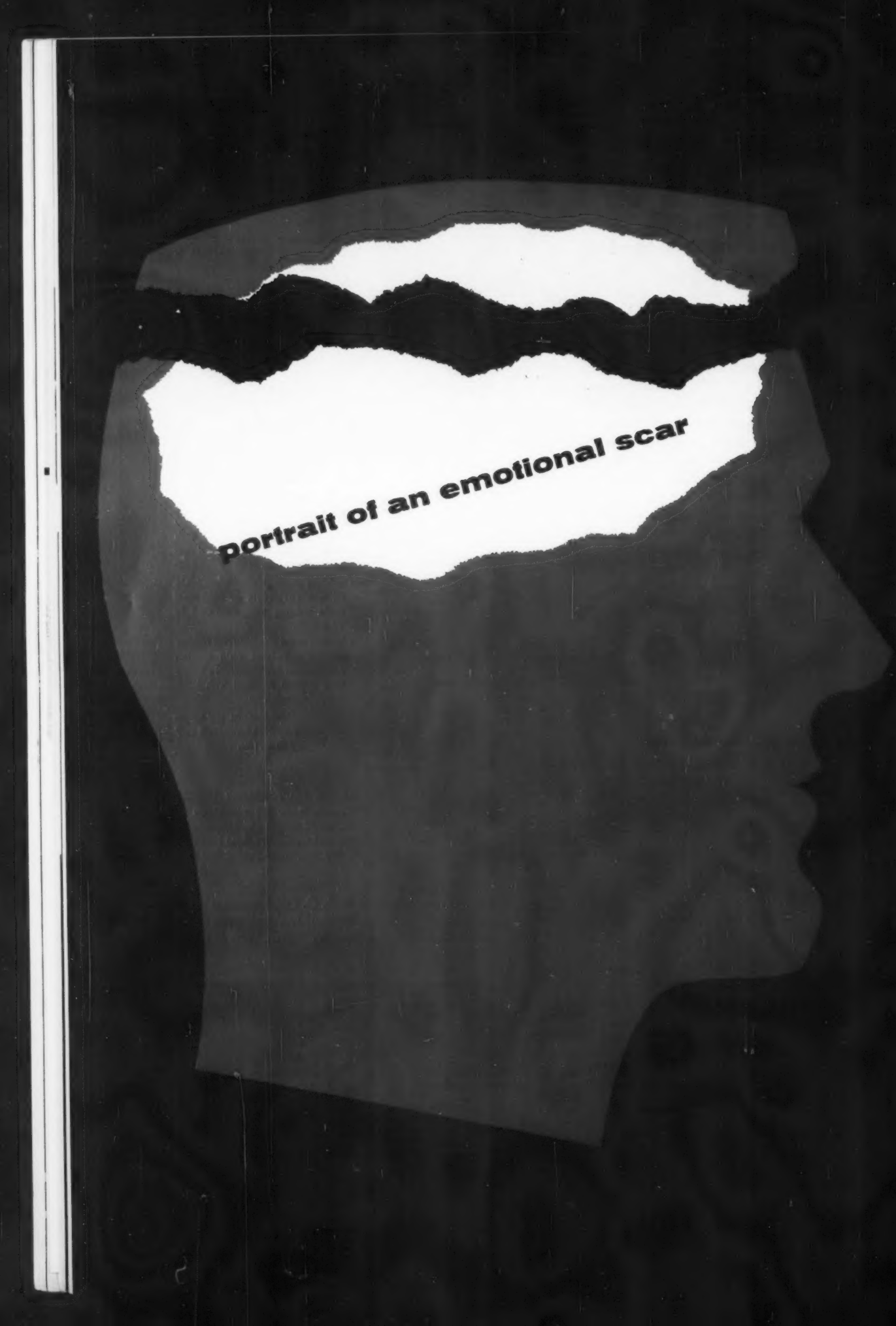
- **Widest voltage range** available on any automatic or semi-automatic welding equipment — *0 to 45.4 volts.*
- **Stellarweld** direct-current reactor materially reduces weld spatter, especially at lower currents, makes CO_2 process practical with light-gauge material.
- **Slope control** permits any variation of volt-ampere curve from very flat to very drooping.

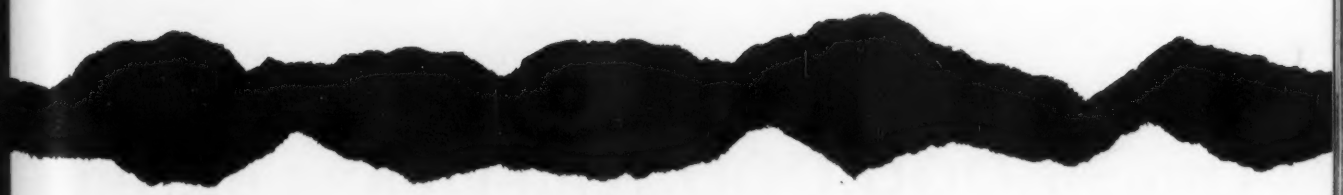
CRATER FILL PROBLEMS
Variable crater fill adjustments on C-OMATIC control panel are micrometer dial type — five times the range of any competitive pointer dial type.

For the complete story on A. O. Smith automatic and semi-automatic CO_2-shielded welding processes, write for informative booklet, "Who's Who in CO_2."

Through research A.O. Smith *... a better way*

A.O.Smith
CORPORATION
WELDING PRODUCTS DIVISION
Milwaukee 1, Wisconsin
A. O. Smith INTERNATIONAL S. A., Milwaukee 1, Wisconsin, U.S.A.


portrait of an emotional scar



How can you depict the shock, anger and disappointment that really takes place when it happens? How does *anybody* know how it feels to see a die crack during the last few minutes of heat treating? How can anybody know, except the man responsible for purchasing the original piece of steel?

What went wrong? Heat treating procedures checked out O.K. And it *should have* been a good piece of steel. It came from a reliable mill that uses all the standard methods of specialty steelmaking and applies all the normal quality controls. Furthermore, tool and die steel from the same mill had been satisfactory on other jobs.

Predictable performance . . . no predicaments. *Carpenter's revolutionary new* MEL-TROL® *process* is not a standard method for making specialty steels. It's exclusive. It utilizes a new patented mold which reduces segregation of harmful impurities during solidification of the ingot. This ingot is far more uniform. You get steel which is cleaner, sounder, tougher from surface to center . . . in every bar . . . in every lot. It takes the guesswork out of toolmaking, because you know *in advance* what results you will get.

Avoid emotional scars. Next time order Tool and Die Steels from your nearby *Carpenter* SERVICE-CENTER. You'll look better in the eyes of your Company.

tool and die steels
stainless steels
electronic, magnetic and electrical alloys
high temperature alloys
special-purpose steels
tubing and pipe
fine wire specialties

***Carpenter* steel**

a new company 70 years old.

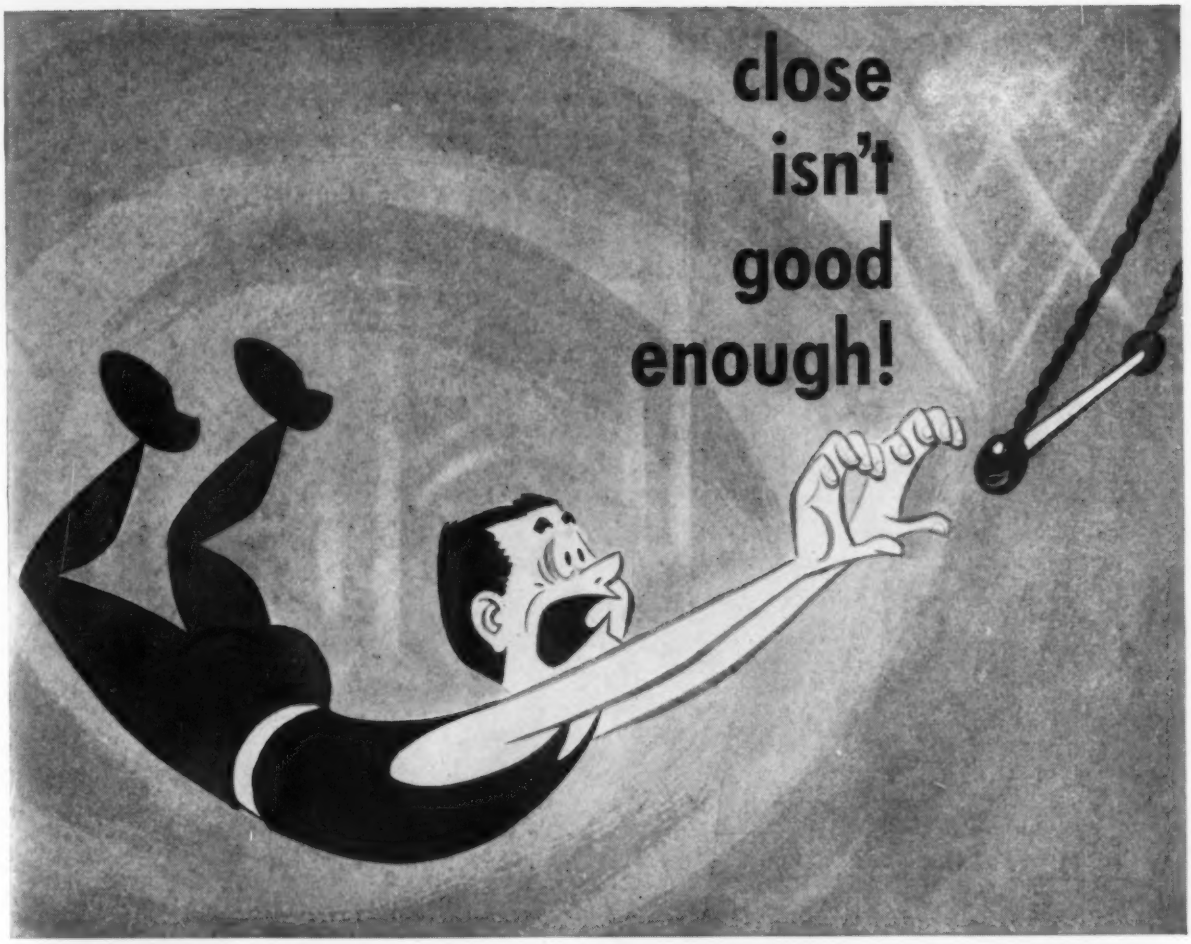
The Carpenter Steel Company, Main Office and Mills, Reading, Pa.
Alloy Tube Division, Union, N. J.
Webb Wire Division, New Brunswick, N. J.
Carpenter Steel of New England, Inc., Bridgeport, Conn.

Over 1,000,000 Americans cured of cancer! Enough to fill the famous Rose Bowl ten times over. All of them alive and well because five, ten or even twenty years ago they went to their doctors in time.

In a single generation, cancer's cure-rate has been raised to one-in-three saved from one-in-seven saved...largely due to the trail-blazing programs of the **American Cancer Society.**

To learn how to guard yourself and your family against cancer, call our nearest office or write to **"Cancer"** in care of your local post office.

Space for this message was contributed by The IRON AGE as a public service



How close do you specify balancing tolerances for your rotating parts? Are they close enough? Can your balancing equipment meet them accurately, quickly, or do you depend on your operator's judgment? It's worth knowing because it costs far less to balance precisely than to correct product failures and regain lost customer confidence once a breakdown occurs "in the field."

In balancing, either it's right or it isn't. For example, consider the accuracy of angular location of unbalance. You make the right *amount* of correction—but place it only 5° off the required location and you still have 9% of the original unbalance left. This means vibration—and eventual trouble.

Gisholt Balancers assure you of highest accuracy in locating and measuring unbalance, enable you to correct in smaller increments—in both single and/or two-plane balancing operations. And they do it faster, easier, using unskilled personnel.

Test before you buy. To help you *specify* the balancing equipment best suited to your needs, Gisholt offers a new booklet, "Performance Tests for Balancing Machines." No *reliable* supplier of balancing machines will refuse to cooperate in these tests. For your free copy, call your Gisholt Representative or write us.

This Gisholt 1S Balancer is used to locate and measure unbalance in Dynamotor armatures. The direct reading amount meter is calibrated so that one meter unit equals ⅛" length of ⅛" diameter solder. Work is corrected in left and right correction planes, using simple soldering iron, and rotated again to inspect for balance. Production—by the female operator shown—over 40 parts per hour.

GISHOLT MACHINE COMPANY
Madison 10, Wisconsin

Investigate Gisholt's Extended Payment and Leasing Plans

Turret Lathes • Automatic Lathes • Balancers • Superfinishers • Threading Machines •
Factory-Rebuilt Machines with New-Machine Guarantee

YOU'LL FIND IT HERE

the abrasive wheel with the characteristics you want

SIMONDS CUT-OFF WHEELS

For cutting metals *and* costs, use these abrasive wheels. They are just about the quickest, most efficient way to cut all kinds of metal and non-metals, and, since Simonds makes them in all grain, grade and bond combinations, you are sure of getting the ones exactly suited to *your* needs.

Regular Resinoid bonded for the rigors of high speed operation. Borolon (aluminum oxide abrasive) for steel bars, tubes, angles, etc. Electrolon (silicon carbide) for cast iron, bronze, brass and non-metals.

Reinforced Resinoid bonded for added strength. Double XX wheels have the same fast action of ordinary resinoid bonded wheels, plus the extra strength of glass fiber reinforcement on both sides. For metals and non-metals, including all building materials except wood.

Regular Rubber bonded for wet or dry grinding. Ideal for cutting all materials under stress and strain. Because of their clean-cutting action, finishing operations can be eliminated.

Reinforced Rubber bonded for extra safety. For swing-frame cutting on gates, risers, etc. Available with (1) Standard Reinforcement; fiber glass on both sides (2) Double Reinforcement; reinforced internally in addition to both sides, or (3) Triple Reinforcement; two internal reinforcements in addition to both sides.

Write for informative bulletins.

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Proven products
Dependable know-how
Quick supply

***SIMONDS ABRASIVE COMPANY**

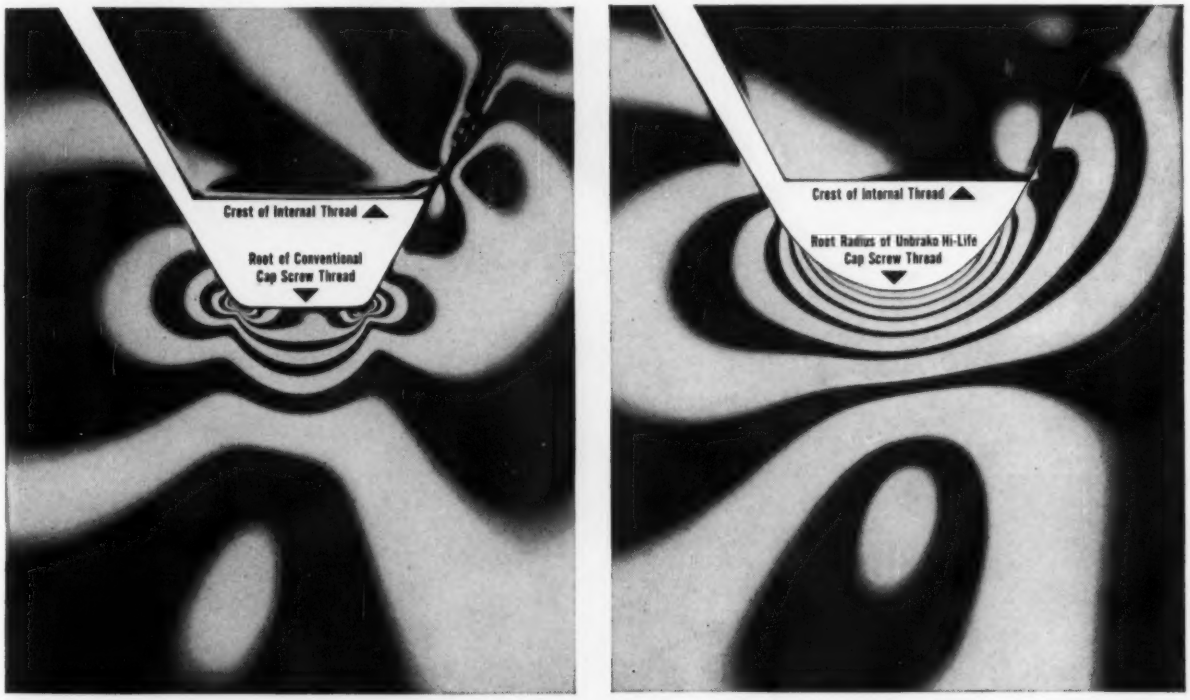
Tacony & Fraley Sts. • Philadelphia 37, Pa.

Division of Simonds Saw and Steel Co.

BRANCHES: CHICAGO • DETROIT • LOS ANGELES • PHILADELPHIA • PORTLAND, ORE. • SAN FRANCISCO • SHREVEPORT
IN CANADA: SIMONDS CANADA SAW CO., LTD., GRINDING WHEELS DIVISION, BROCKVILLE, ONTARIO

SPS RELIABILITY / *A dynamic standard of predictable performance*

The big change is in the threads


Crest of Internal Thread
Root of Conventional Cap Screw Thread
Crest of Internal Thread
Root Radius of Unbrako Hi-Life Cap Screw Thread

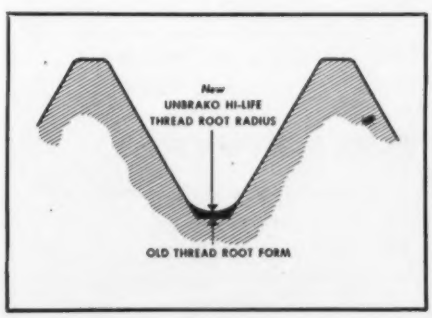
COMPARE THESE PHOTOELASTIC STUDIES

OLD THREAD ROOT FORM has sharp corners which cause high stress concentration and reduce fastener fatigue life.

NEW UNBRAKO HI-LIFE THREAD ROOT has large, smooth radius which distributes stresses, thereby increasing fastener fatigue life.

At no increase in cost, new UNBRAKO Hi-Life socket head cap screws offer

- **Up to 100% greater fatigue life**
- **Increased tensile strength capacity**
- **Additional life insurance for your product**



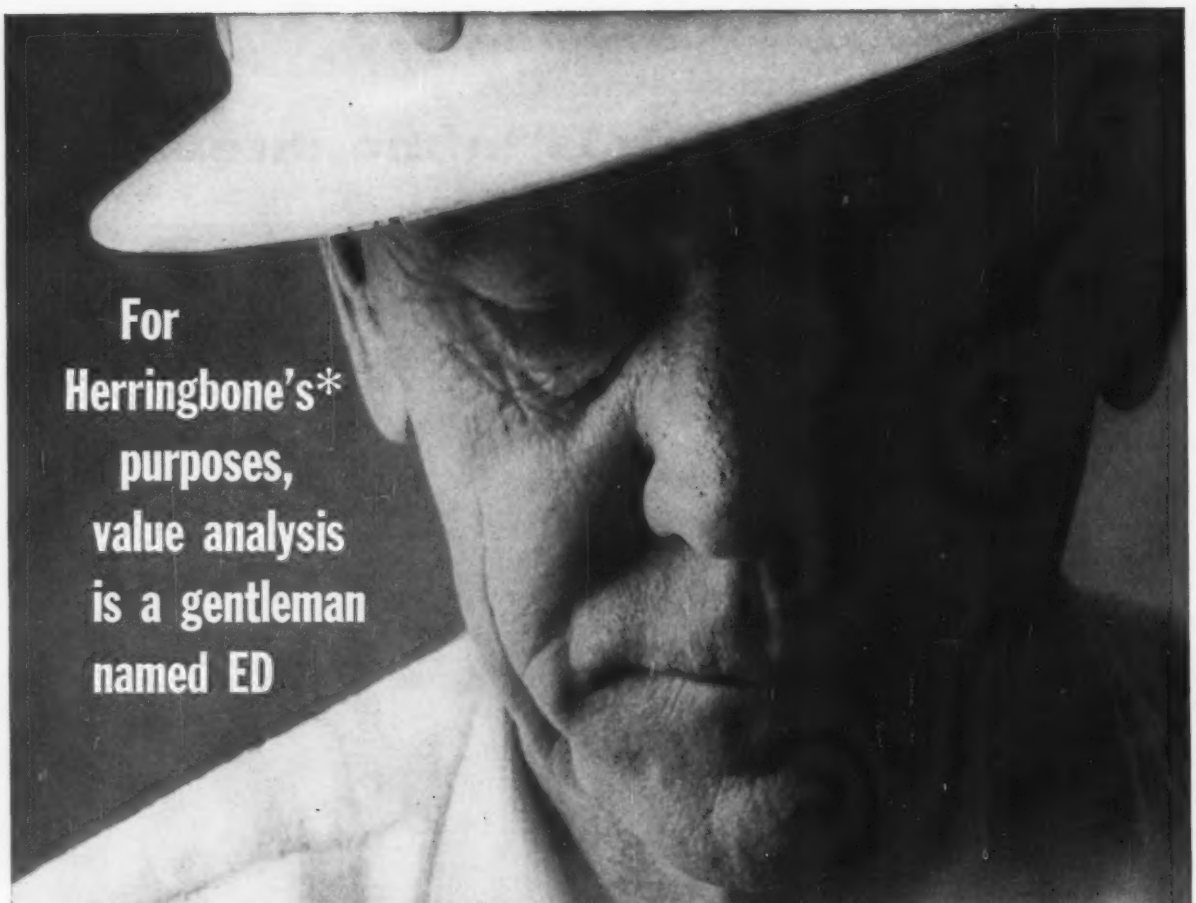
COMPARE THE THREAD ROOT FORMS in the drawing at left. The bottom line indicates the old thread root form. Note the flat roots with sharp corners where cracks start. The top line indicates the new thread root form of UNBRAKO Hi-Life socket cap screws. Note the smooth, flowing curve that dissipates stresses. In addition to increasing fastener fatigue life up to 100%, the larger body cross section provides greater tensile strength, permitting the application of greater preloads.

And there is no waiting for the bonuses you get from new UNBRAKO Hi-Life socket cap screws. SPS distributors are now stocking these new precision fasteners with the improved thread root form, evolved through research on high-strength fasteners. Fatigue life of improved UNBRAKOS can increase the reliability of your product.

For more information, ask your nearest authorized SPS industrial distributor for a copy of Bulletin 2577. Or write SPS—manufacturer of precision threaded industrial fasteners and allied products in many metals, including titanium.

INDUSTRIAL FASTENER Division SPS

JENKINTOWN 17, PENNSYLVANIA



For Herringbone's* purposes, value analysis is a gentleman named ED

Or Joe, or Sven, or whatever the name of the man is in your organization whose opinion on wire rope you most respect. You can take all the value analysis forms ever made and fill them out and get some pretty promising answers. The straightest and clearest answer you'll ever get is from the head gentleman who *works* with the rope; the same man who comes back to you and tells you that the rope he works with *doesn't work*.

We take this stand because the new Roebling Herringbone is championed by men who work with it—the first to feel the impact of a wire rope's success or failure—and the first to tell you about either.

Roebling Herringbone—the two-ropes-in-one rope—is doing things that construction operators find hard to believe—but love to admit. It has prompted a series of some of the nicest testimonials you ever saw.

When you come right down to it, their satisfaction is twofold; after all they are working with both a Lang lay and regular lay rope in one. So they are getting the best that both types of rope construction have to give ... and that's plenty.

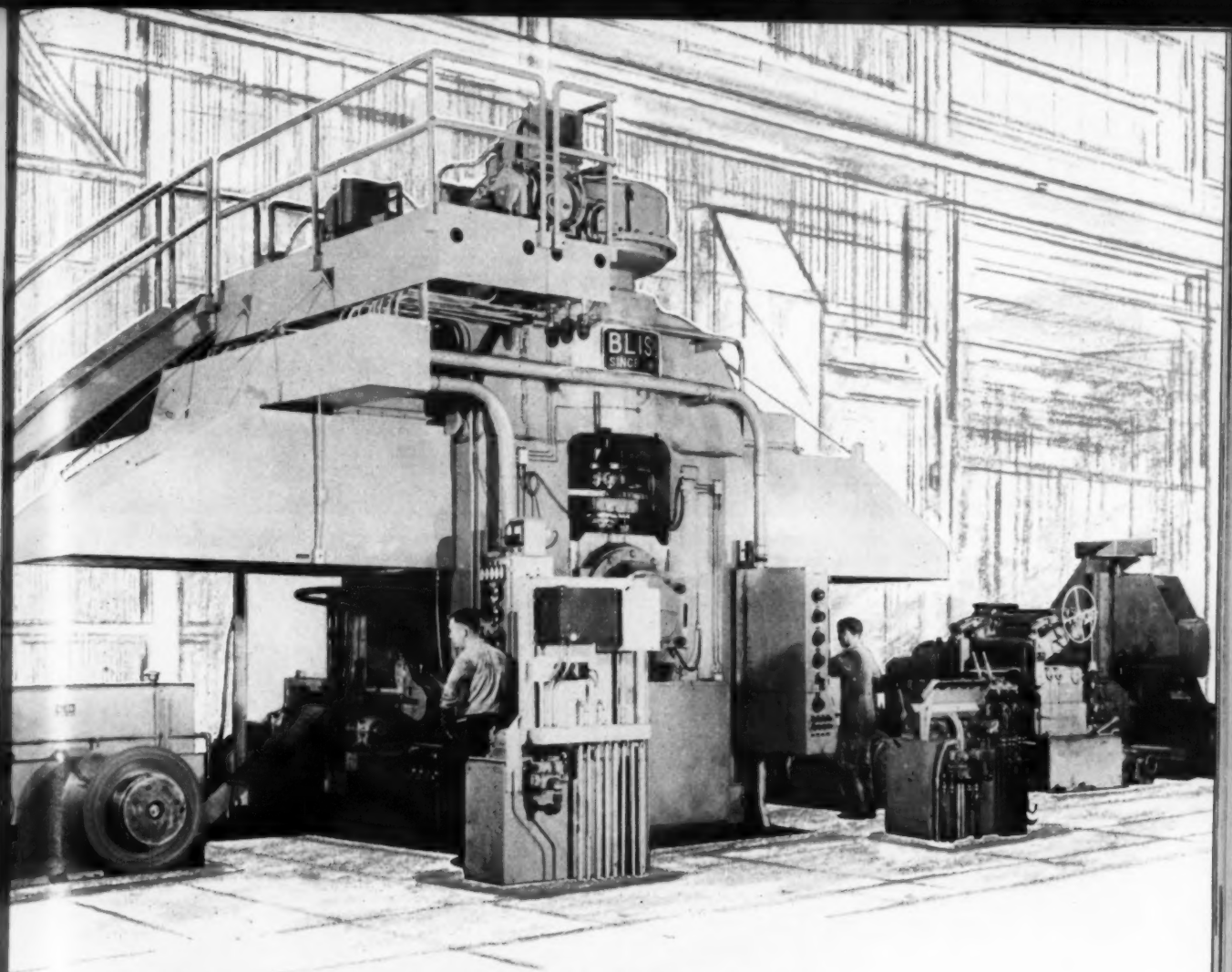
If you want to write us and get some pure, unadulterated field reactions, opinions from men who count, just drop a line to Wire Rope Division, John A. Roebling's Sons Corporation, Trenton 2, New Jersey. With these, we'll take the liberty of sending you the complete information on the rope that makes value analysis a sure thing by the mere specifying... Roebling Herringbone.

*Reg. Appl. For

ROEBLING

Branch Offices in Principal Cities
Subsidiary of The Colorado Fuel and Iron Corporation

Two pairs of Lang lay strands provide greater flexibility.
Heavier outside wires of each strand have greater resistance to abrasion.
HERRINGBONE
WIRE ROPE
One pair of regular lay strands provide superior stability.



AT UNIVERSAL-CYCLOPS' NEW COSHOCTON PLANT:

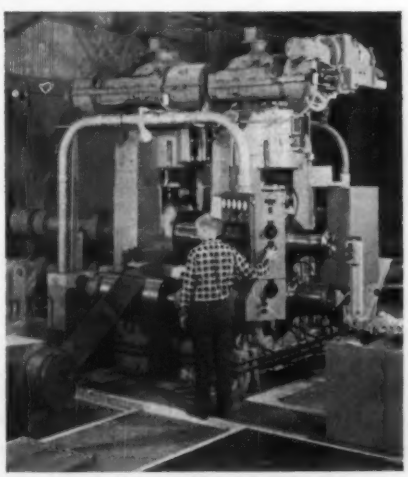
Stainless gets a fine finish fast

All the rolling at Universal-Cyclops Steel Corporation's new stainless strip finishing plant at Coshocton, Ohio, is accomplished on two rolling mills designed and built by Bliss' Rolling Mill Division. Steels rolled include all standard AISI grades in widths up to 24 inches.

Workhorse of the two mills is the 4-high reversing mill shown above. It is ruggedly built to stand heavy rolling stresses developed at speeds as high as 1000 fpm. Auxiliary equipment includes a three-stop coil entry ramp, coil buggy and mandrel-type payoff reel, flattener and feed roll, tension reels and coil buggies.

The two-high Bliss temper mill (right) is used principally for straight chromium grades of stainless providing proper hardness and a lustrous finish to the strip. An unusual design feature is the absence of an entry guide box, eliminating a source of dirt accumulation and strip scratching.

These two mills at Universal-Cyclops are typical of the modern approach to rolling mill design you'll find at Bliss. For other examples of our work, write us today for your complimentary copy of the 84-page Bliss Rolling Mill Brochure, Bulletin 40-B.



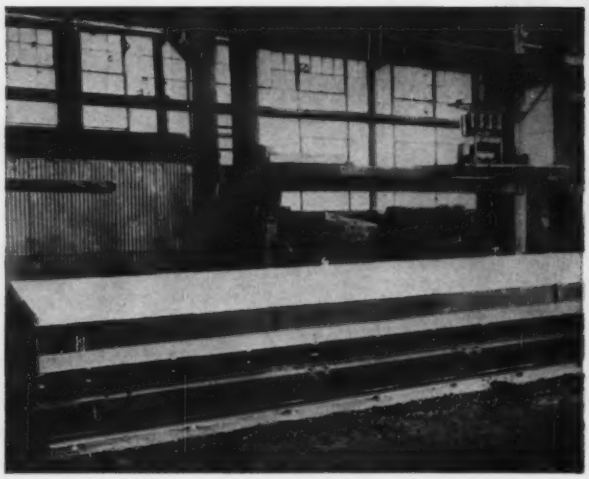
BLISS
SINCE 1857

Bliss is more than a name... it's a guarantee

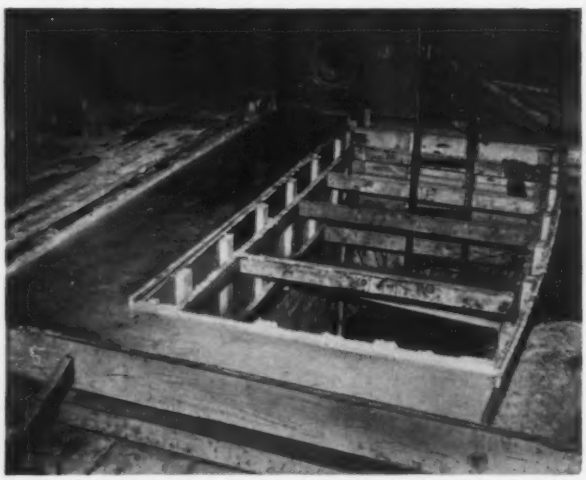
E. W. BLISS COMPANY, Rolling Mill Division, Salem, Ohio

Subsidiary: The Matteson Equipment Company, Inc., Poland, Ohio

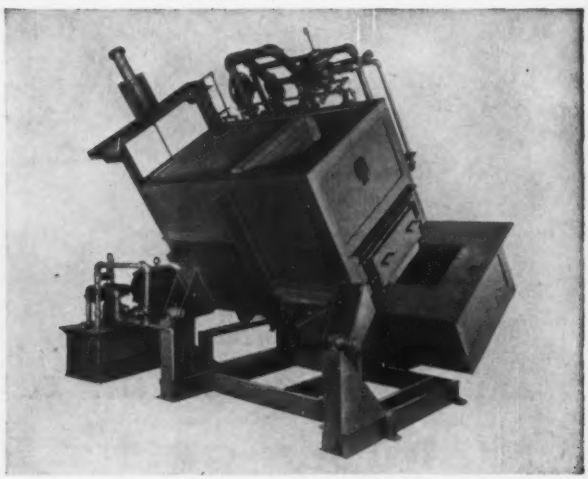
In this stress-relieving furnace, B&W Kaocrete-D is used on the floor ledges, car top, in the door jamb and at the end of the flat roof where it withstands the abrasion of the door. This material is specially designed to withstand severe abrasive conditions and mechanical abuse.



Heavy duty car top service requires a high strength castable. B&W Kaocrete-D is excellently suited for this service at temperatures to 2500 F. B&W Kaocrete-32 is recommended for service above this range.



B&W Kaocrete-32 has been cast to form the curb walls of a soaking pit. When mechanical abuse from ingots damages the curb, Kaocrete-32 has the necessary properties to localize the damage, thus maintaining the serviceability of the rest of the curb.



The castable lining of this aluminum reverberatory furnace must have unusually high strength to withstand the considerable physical abuse of charging, operating and cleaning, while resisting the penetration of the molten metal. Kaocrete-D is widely used in this application.

How B&W refractory castables solve abrasion problems

Refractory castable linings used in metal-working furnaces are often subjected to severe mechanical abuse. Scraping by hand tools, loading and unloading, and the action of the molten metal and particle-laden gases all affect the life of refractories. Among B&W's line of refractory castables are two that are particularly suited to withstand unusual abrasive conditions. They are B&W Kaocrete-D and B&W Kaocrete-32, both of which have been used successfully in many demanding applications.

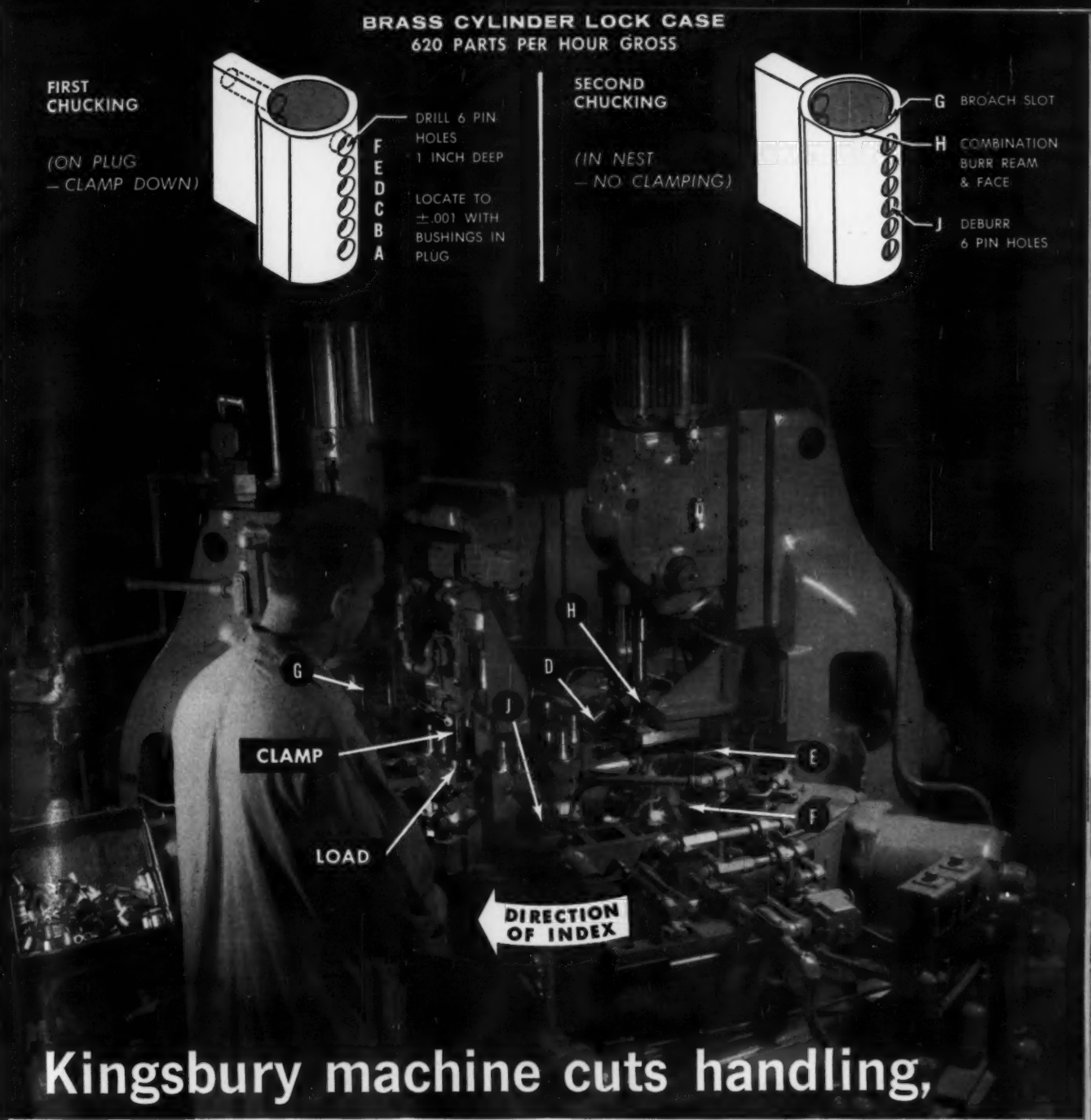
B&W Bulletin R-35A gives additional information on versatile B&W refractory castables. Write for copy to The Babcock & Wilcox Company, 161 East 42nd Street, New York 17, N.Y.

R606R

B&W THE BABCOCK & WILCOX COMPANY

REFRACTORIES DIVISION

B&W Firebrick, Insulating Firebrick, and Refractory Castables, Plastics, Ramming Mixes, Mortars, and Ceramic Fiber.



Kingsbury machine cuts handling, makes big savings on Dexter locks

"Too much handling of lock parts causes nicking and burring. Then the assembled locks bind and we have to rework them," says Dexter Industries, Inc., of Grand Rapids, Michigan.

"Our new Kingsbury has cut our handling way down, eliminating nicks and increasing production by combining several operations in two chuckings of the work. We're delighted with it."

Each part passes twice around the machine. In the first chucking horizontal units at six stations drill the six pin holes, locating within .001. In the second chucking vertical units operate a broach and a combination tool. The last operation deburrs the pin holes; an air cylinder pushes removable pins on a block into the six pin holes.

Typical of what we can do for you. This setup resulted from the joint efforts of our sales engineers and representatives with Dexter's engineers and production men.

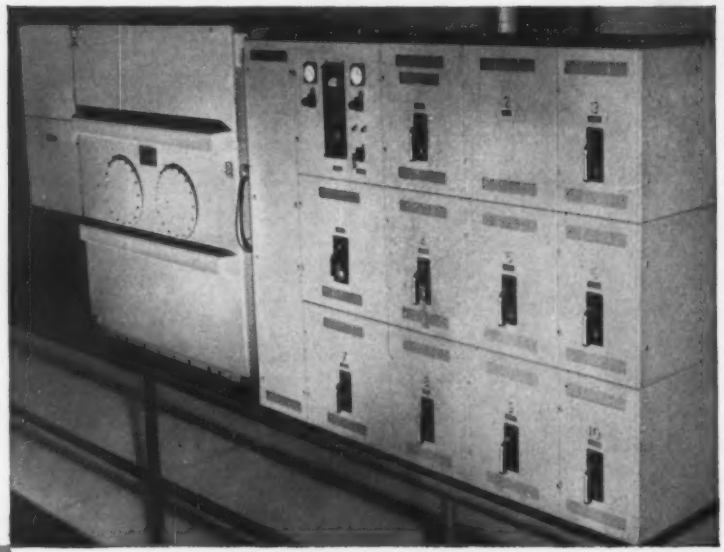
If you have drilling type operations in high production, may we make a proposal? Your Kingsbury will have good basic design and accurate rugged construction. It will be ready to produce when you receive it and will keep on producing. Kingsbury Machine Tool Corp., Keene, N. H.

KINGSBURY MULTI-UNIT AUTOMATICS

Wagner

SEALED DRY-TYPE TRANSFORMERS

These modern unit substation transformers can be safely installed in any load-center—any place—because they are hermetically sealed in welded steel cases to provide positive protection from contamination, fire and explosion hazards. The only maintenance needed is periodic checking of gas pressure (inert nitrogen), case and bushings.



Here's Reliable Power

for your plant electrical system

WAGNER LOAD-CENTER TRANSFORMERS

Wagner

INDOOR DRY-TYPE TRANSFORMERS

These new quiet-type transformers are compact, light in weight, provide a flexible, modern power system to change higher voltage distribution service to lower voltage lighting and power circuits. They meet all safety requirements for indoor installation.

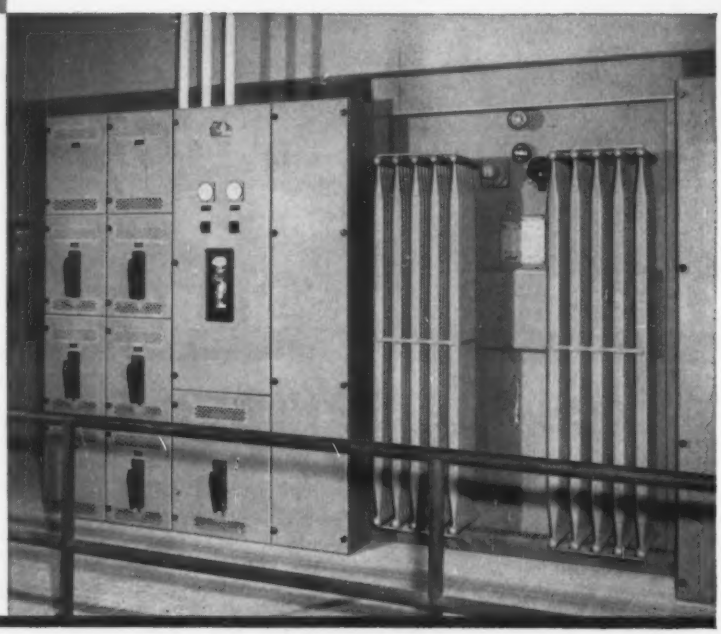
Wagner

NOFLAMOL TRANSFORMERS

Non-inflammable liquid filled. For indoor or outdoor installation. Close-coupled design fits flush against switchgear enclosures, to eliminate and save space. Throat-connected designs are also available.

Bulletins TU-205 and TU-214 give full information on Wagner Load-Center Transformers. Write today.

WT59-2



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Wagner Electric Corporation

6403 Plymouth Ave., St. Louis 14, Missouri.

SERVING 2 GREAT GROWTH INDUSTRIES . . . *ELECTRICAL . . . AUTOMOTIVE*

YOU GET MORE KNOW-HOW WHEN YOUR "SPECS" READ HYATT

because HYATT has built *millions* more cylindrical roller bearings than anyone else for two thirds of a century. And every year for the last 67 years we have learned to make them run longer, smoother, more reliably. Remember, *no bearings carry radial loads like cylindrical bearings—and nobody knows them like HYATT.* Hyatt Bearings Division, General Motors Corporation, Harrison, New Jersey.

HYATT *HY-ROLL BEARINGS*

IN ROLLER BEARINGS HYATT IS THE WORD FOR GM RELIABILITY

The smoother surface of CONTOUR-WELDED* STAINLESS TUBING *gives it greater resistance to corrosion*

Recent tests prove: (1) *Contour-welded* tubing is smoother than any other tubing, and (2) this extra smoothness provides greater resistance to corrosion.

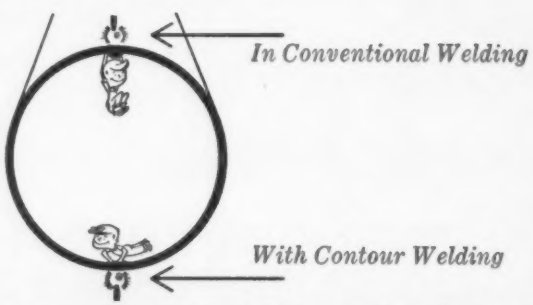
Here's how TRENTWELD® tubing, made by the exclusive *Contour-Weld* process, compares with other full-finished tubing:

- It's smoother than seamless because it's formed from uniformly rolled strip steel, whereas seamless is extruded or pierced.
- It's smoother than other welded tubing because the *Contour-Weld* process, patented by Trent, virtually eliminates the weld bead.

Other tests prove this smoother surface provides *increased resistance to corrosion* — because there are fewer focal points for corrosive attack. Not only that, the smoother surface ensures *longer fatigue life* and *less product incrustation.*

But get full details. Our free 48-page *"Trentweld* Manual" gives complete data on *Contour-Welded* tubing in sizes from ⅛" to 40" O.D., in stainless and high alloy steels, titanium, zirconium, zircalloy and Hastelloy.† Write: Trent Tube Company, Box 2518, Pittsburgh, Pa.

†Trademark Haynes Stellite Co.



In CONVENTIONAL WELDING of tubes, gravity pulls the molten metal down to form a bead that is difficult to remove by cold working. And cold working may lead to undercuts, focal points for fatigue cracks and corrosive attacks. Cleaning becomes difficult.

***With CONTOUR-WELDING** the tube is welded at the bottom. Gravity still pulls the molten metal down inside the tube, but now the weld area corresponds to the contour of the tube. There's virtually no weld bulge on the inside surface. And even on the O.D., the weld seam more closely conforms to the contour of the tubing.

CONTOUR TRENTWELD®

stainless and high alloy pipe and tubing

TRENT TUBE COMPANY

Subsidiary of Crucible Steel Company of America • GENERAL OFFICES: East Troy, Wisc. • MILLS: East Troy, Wisc.; Fullerton, Calif.

OHIO RUBBER

SPRINGBOARD

for a "resistance" movement!

The effective resistance of any rubber or rubber-like component part to aging and weathering, tearing, abrasion, gasoline and oils, acids, water, temperature, soaps and detergents, etc. depends on the skillful and precise mixing of rubber polymers and compounding ingredients.

With accuracy even more precise than humanly possible with the "personal touch" shown here, modern electronic control completely guards every step of this important blending operation at Ohio Rubber. Skill in mixing the *right* combinations of basic materials, is the result of years of experience "Customeering"* components for outstanding manufacturers of original equipment in *every* industry.

To take advantage of this experience write to The Ohio Rubber Company, Willoughby, Ohio.

9PA3

ORCO

THE OHIO RUBBER COMPANY
Willoughby, Ohio

EAGLE EP PICHER

A DIVISION OF THE EAGLE-PICHER COMPANY

*Trade mark of The Ohio Rubber Company

Nationwide Network of Local Service Centers!

Wherever they are, users of Towmotor-Gerlinger fork lift trucks and carriers know that the industry's fastest service is as handy as a phone call. It's one of the reasons why industrial firms have invested millions of dollars in Towmotor-Gerlinger equipment.

Over 90% of parts are replaced off the shelf at local service centers —others within 24 hours! Prompt repairs are made by service experts. Even engine overhauls are treated like emergencies to maintain Towmotor's reputation for *Continuous Operation.* This is aided also by Towmotor Preventive Maintenance Service *which actually averts downtime, prevents wear, cuts repair bills and keeps equipment on the job around the calendar!*

Want more information on this unique Towmotor service? Ask for *Towmotor P-M Service Booklet SP-18.* Write Towmotor Corporation, Cleveland 10, Ohio.

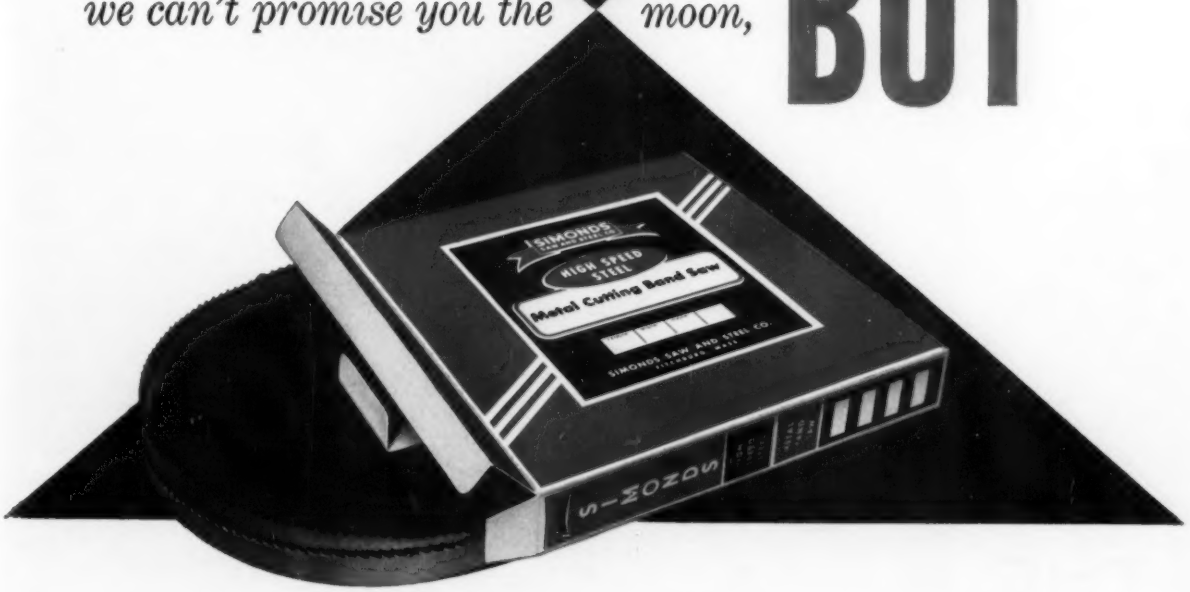
Find Your Nearest Distributor In The 'Yellow Pages'

TOWMOTOR THE ONE-MAN-GANG® -**GERLINGER**

LEADER FOR 40 YEARS IN BUILDING FORK LIFT TRUCKS, CARRIERS AND TRACTORS

**Gerlinger Carrier Co. is a subsidiary of Towmotor Corporation*

we can't promise you the moon, **BUT**



Are you fed up with claims that a certain product will "cut costs" . . . "boost production" . . . "raise operating efficiency" . . . "increase your profits" . . . in short, are you being offered the moon but find yourself left on the launching pad?

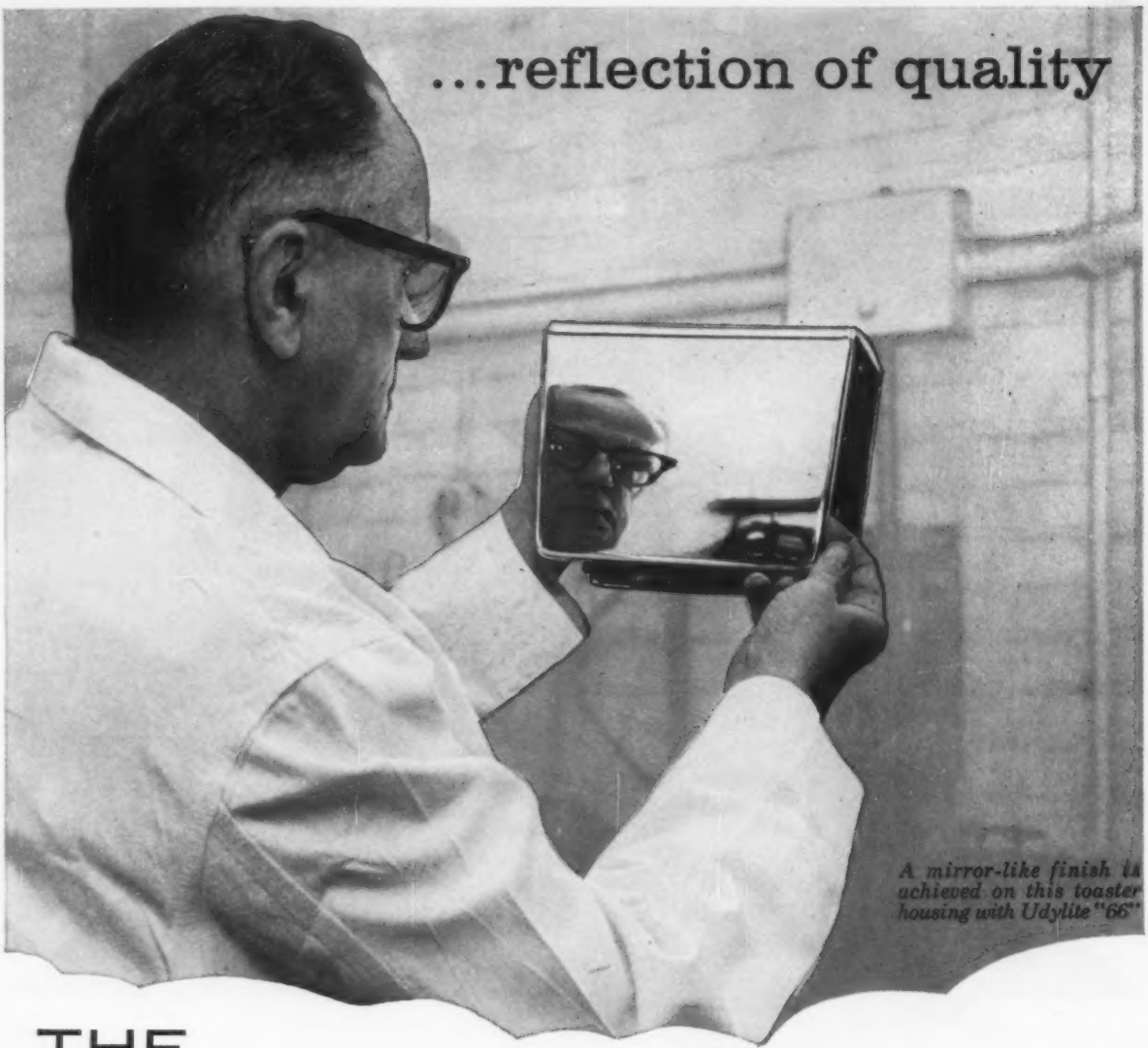
Then you'll want to consider SIMONDS HIGH SPEED STEEL METAL CUTTING BAND SAW BLADE. Here's a blade that actually will do what you want it to in terms of square inches of cutting per hour, per blade . . . in terms of resistance to wear and breakage . . . in savings in downtime for blade changing.

Here's a HIGH SPEED STEEL BLADE we know will measure up to your expectations because (1) it's designed and engineered like a fine cutting tool; it's heat treated by newly developed techniques that produce maximum tooth hardness without damaging the cutting points while maintaining the toughness and flexibility of the back; and it's flex-tested to insure trouble-free on-the-job performance including the weld and (2) report after report from tests and production cutting in large plants in many industries verify that here, at last, is a HIGH SPEED STEEL band saw blade that really works.

We can't (and don't) promise you the moon, BUT we do offer you a saw for production cutting off that will withstand high speeds and heavy feeds and give you straight, accurate cuts with a fine finish. Put a SIMONDS HIGH SPEED STEEL SAW to work for you and find out how much better it really is. Call your Simonds Distributor.

SIMONDS
SAW AND STEEL CO.
FITCHBURG, MASS.
SIMONDS
Industrial Supply
DISTRIBUTOR

Factory Branches in Boston, Chicago, Meridian, Miss., Shreveport, La., San Francisco and Portland, Ore., Canadian Factory in Montreal, Que., Simonds Divisions: Simonds Steel Mill, Lockport, N. Y., Heller Tool Co., Newcomerstown, Ohio, Simonds Abrasive Co., Phila., Pa., and Arvida, Que.



THE INCOMPARABLE "66"

Udylite's Bright Nickel Process "66" is sweeping the country with new installations and conversions to provide a truly incomparable plate with almost unbelievable ease of operation. The color of the process alone, sells "66" in any comparison.

The production of your existing equipment can be *greatly increased* with the introduction of Process "66". Its outstanding qualities include exceptional levelling ability and remarkable ductility for so bright a finish.

In addition, Process "66" has overcome the problems previously considered inherent in plating over semi-bright nickel and, it is unusually receptive to chromium. You'll find that the amazing adaptability of this very bright finish makes it suitable for your finest work . . . moreover it will save you money.

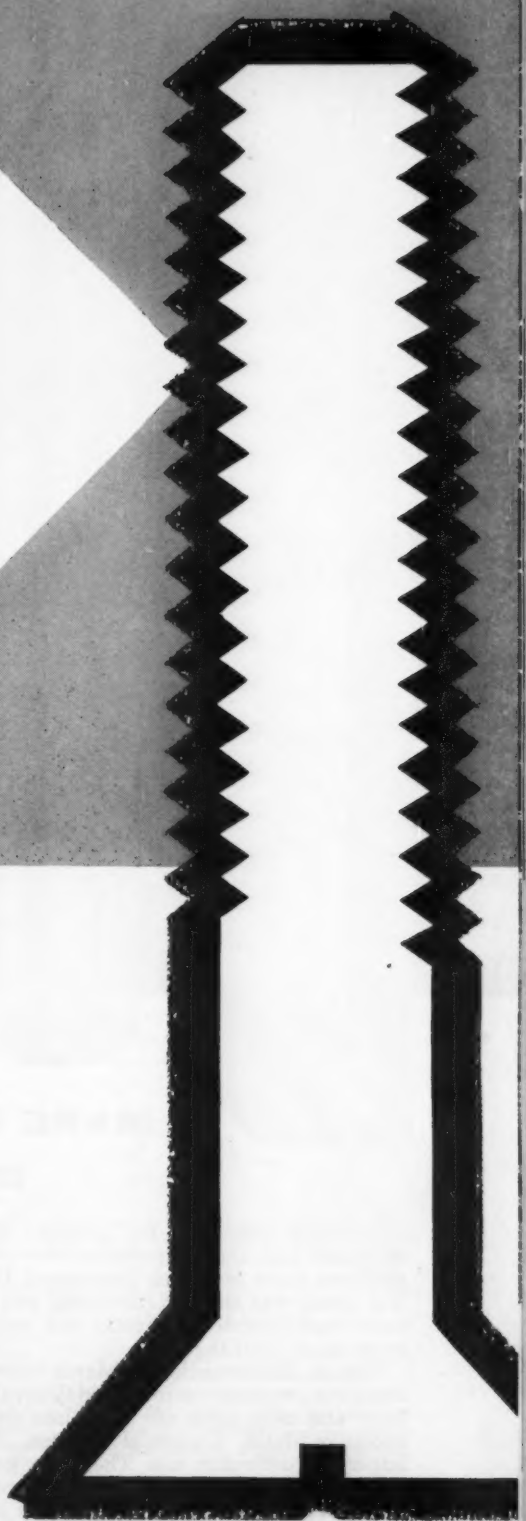
A phone call or letter will start Udylite's "66" Bright Nickel process on its way to help you improve your production. If it sounds too good to be true, just send us a sample of your product . . . we will be happy to test-plate it for you with Incomparable "66". Act TODAY!

SUPER "66" For even greater brightness and levelling where absolute maximum ductility is not demanded, Udylite's SUPER "66" may be specified. You must see this finish to believe its brilliance.

the udylite corporation

detroit 11, michigan • world's largest plating supplier

HOW YOUR REPUBLIC BOLT AND NUT DISTRIBUTOR CAN HELP YOU...



Eliminate delays caused by fastener shortages

Short supplies of fasteners, urgently required to meet tight production schedules, need never be a problem when you rely on your local Republic Bolt and Nut Distributor.

From his complete inventories, he can give you quick delivery of fasteners of any type and size—in any quantity, from a single bolt ... to a case ... to a truckload.

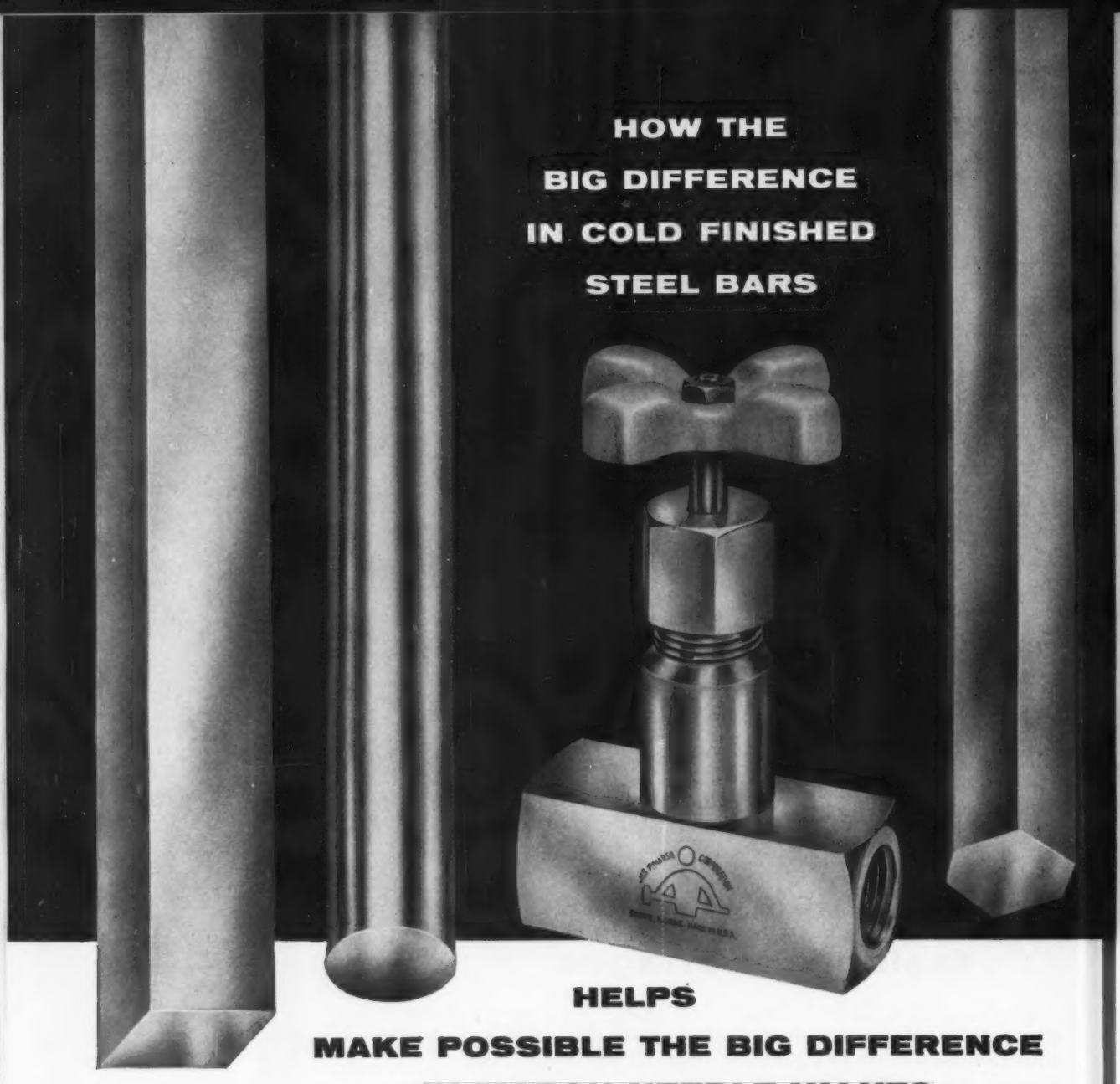
By so doing, your local distributor eliminates the trouble and expense of maintaining your own on-hand stocks. The net result is a reduction in over-all costs—to you, to your customers, and to the eventual consumer. Your local distributor therefore performs a vital function in today's industrial system.

He is also in a position to provide you with complete information on current fastener trends and techniques. It will pay you to familiarize yourself with the wide range of services he offers you. Contact your local Republic Bolt and Nut Distributor now.

Call your local distributor for quick deliveries of...

REPUBLIC Bolts and Nuts

REPUBLIC STEEL



HOW THE BIG DIFFERENCE IN COLD FINISHED STEEL BARS HELPS MAKE POSSIBLE THE BIG DIFFERENCE IN MARSH NEEDLE VALVES

Micrometer regulation and positive shutoff at both extremely high and low pressures were sought for a new precision valve at Marsh Instrument Co., Skokie, Ill. The result was the first throttling and shutoff needle valve that operates efficiently and safely at all pressures up to 10,000 psi.

The big difference in the Marsh valve is the unique one-piece construction from cold finished bar steel. The body and stem guide are fused into one piece by the exclusive Marsh "Conoweld" process. There is another important difference, too. The body, packing nut and packing gland are electro zinc plated, which, with the stainless steel stem, not only provides corrosion-resistance but a clean, glistening, quality appearance.

Bliss & Laughlin's Lusterized® cold drawn bar steels are used by Marsh for this unique valve. Free from drawing oils, lime and processing grit, B&L Lusterized bars contain a minimum of processing contaminants to interfere with Marsh's fusion process and precision machining. B&L Lusterized bars also readily take the zinc plating without elaborate preparation because they start out cleaner, brighter and are easier to handle.

There is a good chance the big difference in cold drawn bars—the B&L Lusterized difference—can contribute importantly in helping establish a big difference for your product, too. It's worth checking, especially since you pay no more when you specify "Bliss & Laughlin Lusterized."

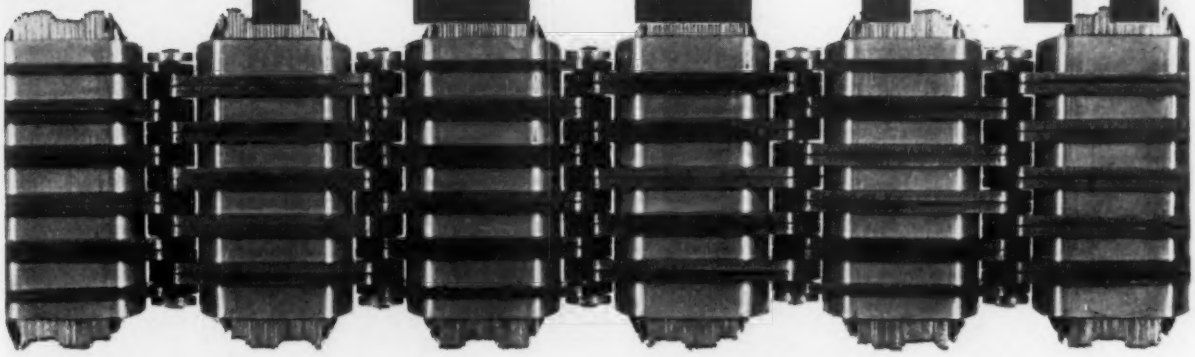
Originators of LUSTERIZED® Finish—The BIG DIFFERENCE in Cold Drawn Steel Bars

BLISS & LAUGHLIN

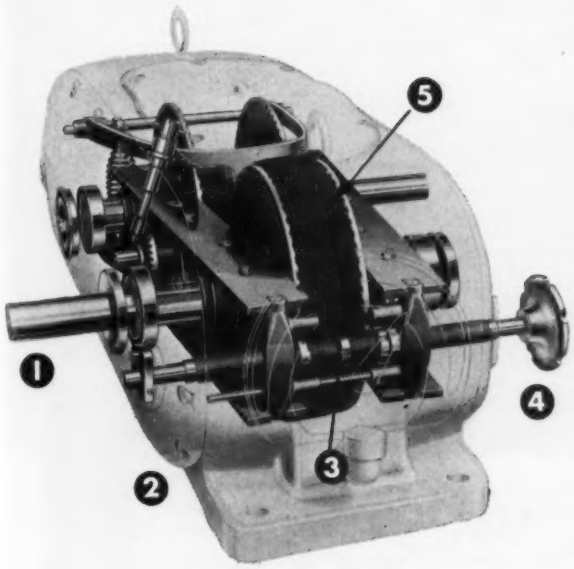
GENERAL OFFICES: Harvey, Ill. • PLANTS: Harvey, Detroit, Buffalo, Mansfield, Mass.

Specialists in Finish, Accuracy, Straightness, Strength and Machinability

PUT TEETH



IN YOUR SPEED CHANGING JOBS



Get the positive, accurate control that only LINK-BELT's chain-driven P.I.V. can deliver

Yes, you put teeth into your speed changing jobs because Link-Belt P.I.V.—unlike other variable speed drives—utilizes an exclusive metal, self-tooth-forming chain.

Here's how it works! P.I.V. chain consists of a series of overlapping steel links. The links contain packs of slats which are free to move from side to side, singly or collectively, to serve as teeth. The chain meshes with radially grooved wheels, which are cut to a constant depth towards the wheel periphery. Beveled sides of the grooves offer gripping areas . . . provide a positive, nonslip contact at any speed, under all loads.

Makes changing speed simple too! A turn of the control screw simultaneously varies the effective diameters of the conically shaped wheels—closing one set, spreading the other. At the same time, the self-tooth-forming chain automatically adjusts to provide desired ratio between the input and output shafts.

BOOK 2274—Your Link-Belt office or authorized stock-carrying distributor has Book 2274 on P.I.V. drives from ½ to 25 hp. Refer to the yellow pages of your local phone directory under Power Transmission Equipment.

(1) You can get minute speed changes and maintain them accurately while operating under full load.

(2) All-metal, totally enclosed—unaffected by atmospheric conditions. All vital operating parts splash-lubricated from a common housing reservoir.

(3) Easy-view speed indicator facilitates speed selection and adjustments to meet all requirements.

(4) An infinite number of positive, stepless speed adjustments may be made with manual, electric, pneumatic or hydraulic controls.

(5) Self-tooth-forming chain is made from a series of overlapping steel links. Links contain packs of hardened steel laminations or slats (shown above). Slats grip toothed wheels positively without slippage —give the speed you need at any setting.

15,240

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To serve Industry There Are Link-Belt Plants, Sales Offices and Stock Carrying Distributors in All Principal Cities. Export Office, New York 7; Australia, Marrickville (Sydney); Brazil, Sao Paulo; Canada, Scarboro (Toronto 13); South Africa, Springs. Representatives Throughout the World.

LINK-BELT

P.I.V. VARIABLE SPEED DRIVE

union tank car company speeds car movement with trackmobile®

Many railcars move quickly and efficiently in and out of one of the world's most modern railcar repair shops. A single Trackmobile handles them all at the Union Tank Car Company's giant dome-shaped plant near Baton Rouge, La. Trackmobile pulls them inside the shop and teams up with a Whiting Radial Transfer Table to keep all maintenance stations busy. A most versatile machine, Trackmobile transfers easily from rail to road. Plants throughout the country use it to haul, switch, and spot.

FOR MORE INFORMATION on Trackmobile at Union Tank Car Company write for Bulletin 245. *Whiting Corporation, 15601 Lathrop Avenue, Harvey, Illinois.*

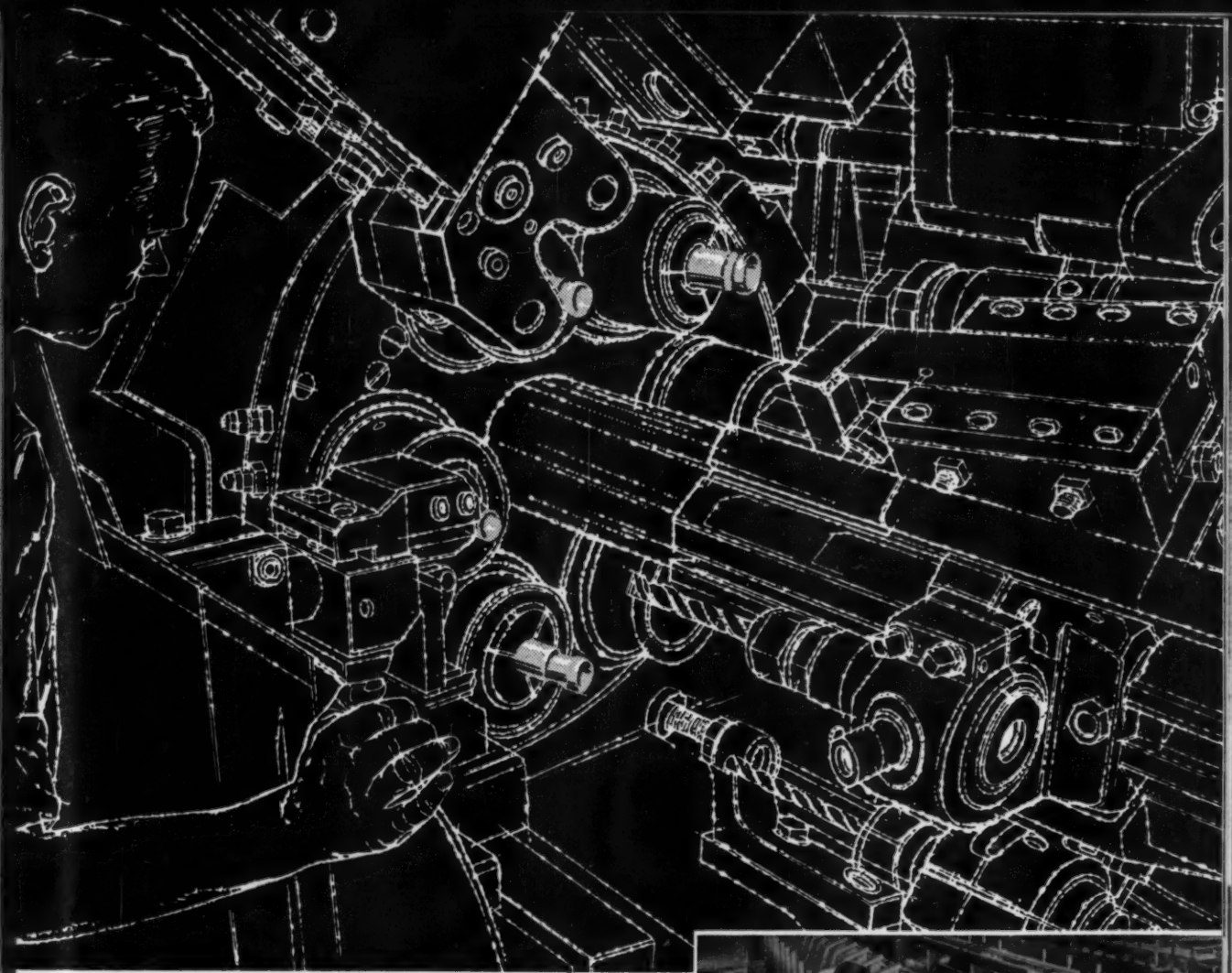
75th year

COST-SAVING EQUIPMENT . . . THE WAY TO HIGHER PROFITS..

TRACKMOBILE®

WHITING

MANUFACTURERS OF CRANES; TRAMBEAM HANDLING SYSTEMS; TRACKMOBILES; FOUNDRY, RAILROAD, AND SWENSON CHEMICAL EQUIPMENT.



The Ultimate Test

The ultimate test of quality in stainless steel bars takes place in screw machine production, where every bar is literally cut to pieces.

The Perry-Fay Company, Elyria, Ohio, a leader in screw machine production, has been subjecting J&L bars to this demanding production-line test for more than a year, **without a single failure, without a single reject.** Perry-Fay reports: "We consistently get superior surface finish, closer tolerances, fully formed rolled threads with J&L stainless bars."

Whether you need stainless steel bar stock for high-speed, high-production operations, or a single bar for extraordinary requirements, turn to J&L. J&L leads the industry in melt shop standards for stainless steel, the point where quality starts—and new production profits begin.

Careful attention to every production detail is the key to J&L quality.

J&L
STAINLESS
SHEET • STRIP • BAR • WIRE

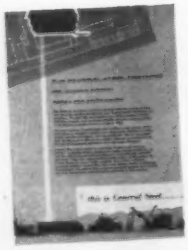
Plants and Service Centers:
Los Angeles • Kenilworth (N. J.) • Youngstown • Louisville (Ohio) • Indianapolis • Detroit

Jones & Laughlin Steel Corporation • STAINLESS and STRIP DIVISION • Box 4606, Detroit 34

...where industrial progress is cast in steel

Accurate measurement of ingredients and periodic analysis insure the correct chemistry for the many different alloys produced at General Steel.

METALLURGICAL SERVICE... EXPERT ANALYSIS AND COUNSEL



Write for folder: **How General Steel Castings Can Improve Product Design and Performance.** General Steel Castings, Station 201 Granite City, Illinois.

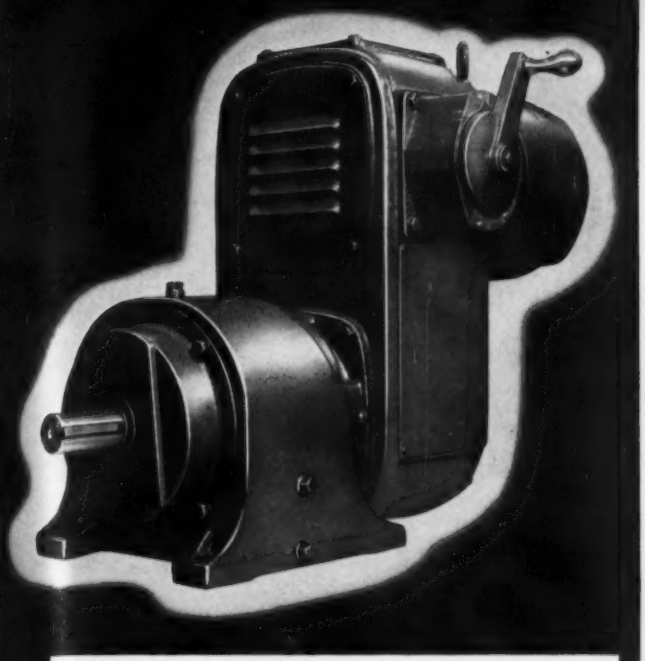
Optimum design in cast steel structures for your products can be gained only through application of a *complete* range of services. One of these is our metallurgical service consisting of expert counsel and accurate control of steel analysis... another area in which General Steel is well equipped and staffed.

This expert metallurgical counsel and the facilities of each of our laboratories are available for solving metallurgical problems for customers.

A vast backlog of knowledge and experience is available to you. Let us work with you from the "raw-idea" stage... in this way you benefit from our complete services from creative analysis and engineering to follow-through of performance in the field.

GENERAL STEEL CASTINGS

GRANITE CITY, ILL. · EDDYSTONE, PA. · AVONMORE, PA.



NEW General Electric Polydyne* drive provides

DEPENDABLE LOW-COST ADJUSTABLE SPEED

straight from a-c power in ratings from 1/4 to 25-hp!

General Electric's new Polydyne drive is a compact, completely packaged unit consisting of a-c driving motor, belt transmission, output gearing and control.

NOW IN STOCK—These factory- and field-tested drives are available in configurations and ratings to meet virtually all your requirements!

G-E Polydyne drive has a completely new control design that prevents binding or sticking of speed control mechanism, and it responds smoothly and quickly to speed adjustment. Polydyne mechanical adjustable-speed drive is the drive to use when and where you want:

- Most efficient process speed
- Maximum machine life
- Minimum maintenance requirements
- Machine versatility

EASY MAINTENANCE—Advanced design makes belt changing fast; reduces chance of damage to drive shaft and bearings during belt change and eliminates shaft realignment after change.

General Electric helical reducer gears can be removed as a unit for fast inspection, and Polydyne drives require minimum lubrication.

FOR MORE INFORMATION on G.E.'s complete PLUS LINE with Polydyne drive, contact your nearby G-E Apparatus Sales Office or Distributor, or write for bulletins: Polydyne Drive (GEA-6806), G-E Helical Gear Motor Line (GEA-6704), Shaft-mounted Speed Reducers (GEA-6616), Fractional Horsepower Gear Motors (GEA-6133A), Section 854-2, General Electric Co., Schenectady, N. Y.

* Trademark of General Electric Company.

You get all these PLUS VALUES with General Electric Mechanical Power Transmission Equipment

PRODUCT APPLICATION SERVICE—G-E engineers are available to help you analyze and select the right equipment for your job.

PROMPT SHIPMENT—You get fast delivery on all standard General Electric units—from distributor or factory stocks.

SALES SERVICE—Your inquiries, quotations and requests for bids are handled promptly by G-E field service offices.

AFTER SALES SERVICE—50 G-E Service Shops and 500 authorized Small Motor Service Stations offer expert repair service on all G-E Gear Motor products.

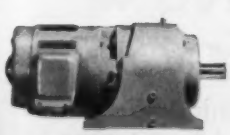
MANUFACTURER RESPONSIBILITY—G.E. focuses manufacturing responsibility at one source, for it produces *all* gearing, components and motors in its line.

MANUFACTURER REPUTATION—Advanced technology built into G-E mechanical power transmission equipment assures you that it will meet your specifications—adds to and builds preference for your product.

Progress Is Our Most Important Product

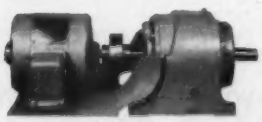
GENERAL ELECTRIC

Choose from General Electric's PLUS LINE of Mechanical Power Transmission Equipment



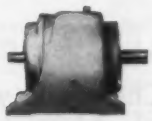
Integral-type gear motor

Right-angle shaft gear motor



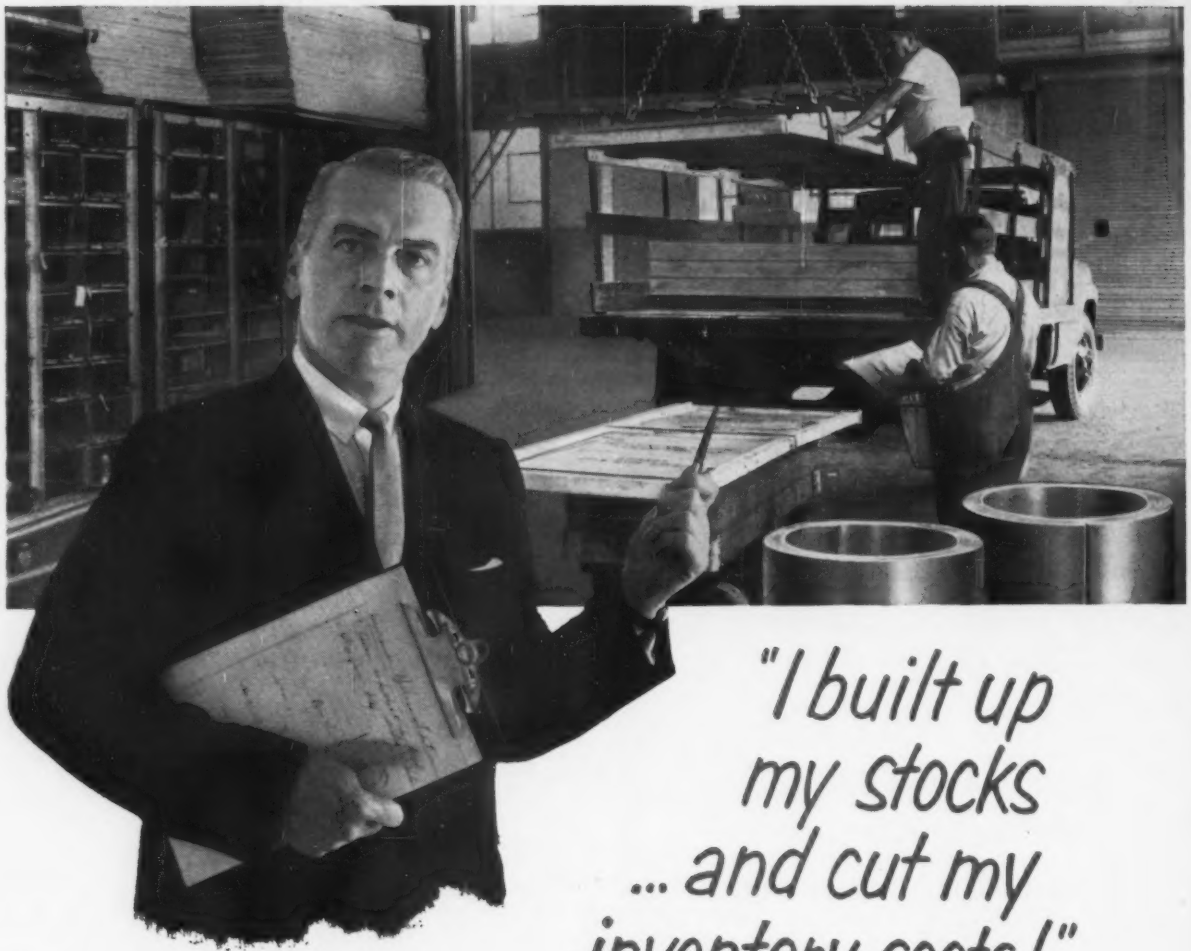
All-motor gear motor

Offset-shaft gear motor

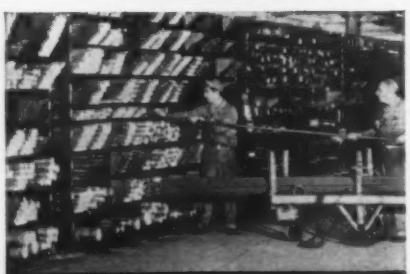


Helical speed reducer

Shaft-mounted speed reducer



"I built up my stocks ... and cut my inventory costs!"



The cost of keeping a complete inventory of aluminum on hand *can* be cut . . . a lot more than you might think! Your nearby Reynolds Distributor provides a *complete* aluminum service. He can get you the aluminum *you need*, and he can get it to you, *fast!* There's no need to tie capital and working space in inventory when you can rely on the Reynolds Distributor nearest you.

Call on him, too, for technical advice and for the many services he can offer. His staff is aluminum-trained. They'll be happy to serve you. *Reynolds Metals Company, P.O. Box 2346-DH, Richmond 18, Virginia.*

Watch Reynolds TV shows—"ALL STAR GOLF" and "ADVENTURES IN PARADISE"—ABC-TV.

FOR FAST DELIVERY OF ALUMINUM, CALL THE REYNOLDS DISTRIBUTOR

Check the yellow pages of your telephone directory, under "Aluminum"

As he cuts off steel...
he adds the "Touch of Gold"

The cut-off wheel this man is using is one of the complete Norton line, developed to bring the value-adding "Touch of Gold" to all cutting-off jobs, on all metals and the widest variety of non-metallic materials.

For wet or dry cutting, on manual or automatic machines, Norton cut-off wheels are available in ALUNDUM* aluminum oxide and CRYSTOLON* silicon carbide abrasives . . . in resinoid, rubber and shellac bonds . . . with or without reinforcement of glass cloth, nylon, cotton or combinations of these.

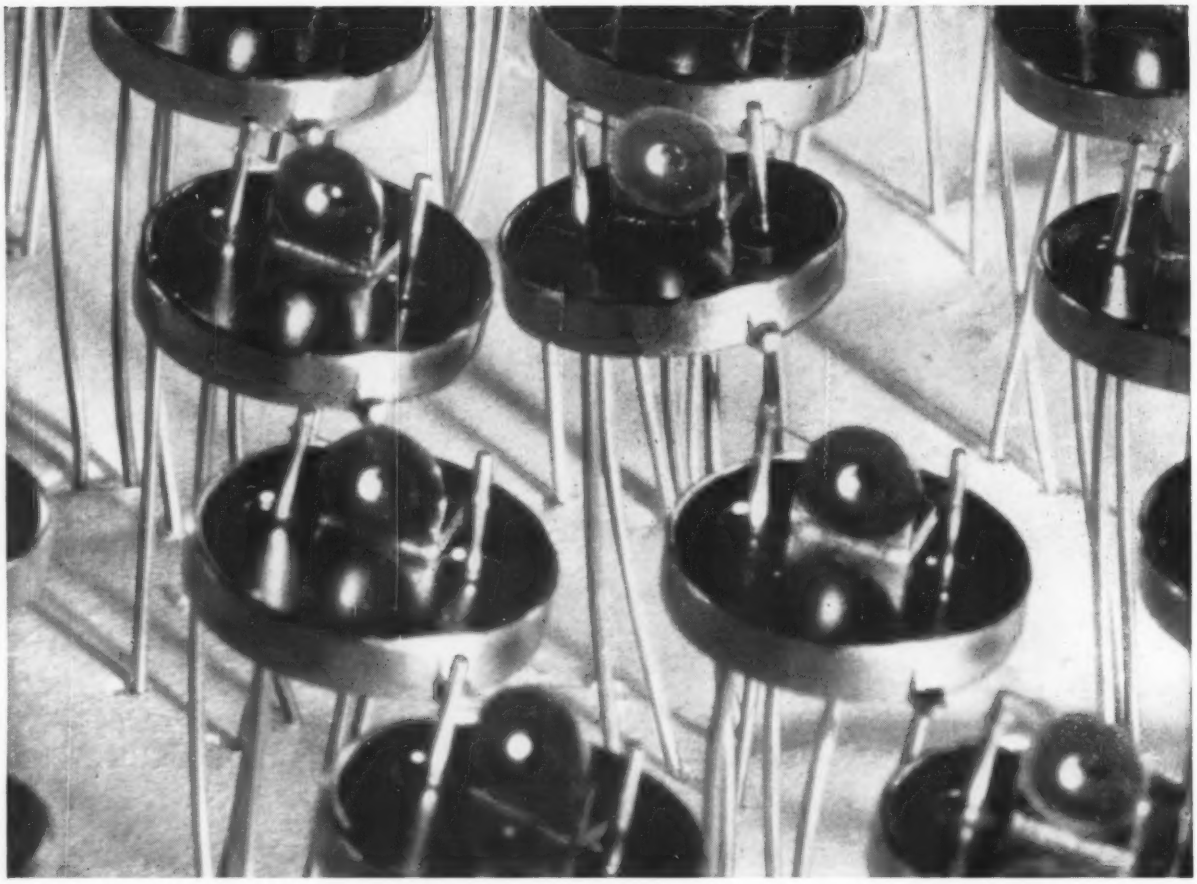
Backed by leadership in abrasive product development, Norton cut-off wheels are recognized as the most efficient, most economical production tools of their type. Your Norton Man, a trained Abrasive Engineer, and your Norton Distributor will be glad to tell you how these "Touch of Gold" benefits can be brought to your own production. NORTON COMPANY, General Offices, Worcester 6, Mass.

*Trade-Mark Reg. U.S. Pat. Off. and Foreign Countries

NORTON
ABRASIVES

Making better products . . . to make your products better

NORTON PRODUCTS: Abrasives • Grinding Wheels • Grinding Machines • Refractories • Electro-Chemicals — **BEHR-MANNING DIVISION:** Coated Abrasives • Sharpening Stones • Pressure-Sensitive Tapes



IBM, Poughkeepsie, N. Y.: Critical alloying and bonding temperatures determine final operating characteristics of germanium transistors (above).

Alloying and bonding temperatures a problem?

Not at IBM, Poughkeepsie, N. Y., where Speedomax® H is helping alloy the "dots" and bond the "whiskers" in the manufacture of transistors for their data processing equipment. The right alloy and proper bond depend upon temperature . . . determine transistor operating characteristics. At IBM, Speedomax H is holding these critical temperatures to within 2 degrees F . . . reproducing desired processing conditions, again and again. Rugged, compact and thoroughly reliable, this modern controller is providing equally dependable control for many other heat treating processes . . . helping to produce both process economies and a quality product. *Whatever your heat treat, it'll pay you to investigate Speedomax H! For details, contact your nearest L&N office or write 4956 Stenton Ave., Phila. 44, Pa.*

Operator loads CM furnace with tray of germanium wafers. Routine check with traveling thermocouple and Speedomax Type G AZAR recorder proves Speedomax H holds temperature gradient of soak zone to within 2 F.

80-ton trailer hauls 5 times its own weight!

built from USS MAN-TEN and USS "T-1" Steels

LeTourneau-Westinghouse designed this bottom dump hauling unit to carry the greatest payload with the least possible empty weight. The trailer weighs just over 15 tons but will haul a whopping load of 80 tons or more. This gives it an extremely high ratio of payload to weight and makes the unit most economical on fuel, tires and other operating cost items.

The trailer was built with USS MAN-TEN High Strength Steel in the body and USS "T-1" Constructional Alloy Steel in the highly stressed rear-axle assembly. This combination produced a tough wear-resisting unit that would take the beatings from coal or rock or whatever had to be hauled.

MAN-TEN Brand Steel combines a strength level of 50,000 psi yield point min. with superior abrasion resistance. "T-1" Steel was used because its extra high yield strength (100,000 psi minimum) resulted in a lighter weight unit which would still take the road shocks at 40 miles per hour. Both steels saved weight and resulted in a payload increase of 10 tons over conventional construction.

For low hauling costs, build equipment with USS Design Steels . . . MAN-TEN for strength with economy, COR-TEN for strength with superior atmospheric corrosion resistance, TRI-TEN for strength with notch toughness and "T-1" for extra high yield strength and impact abrasion resistance. For more information, write to United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

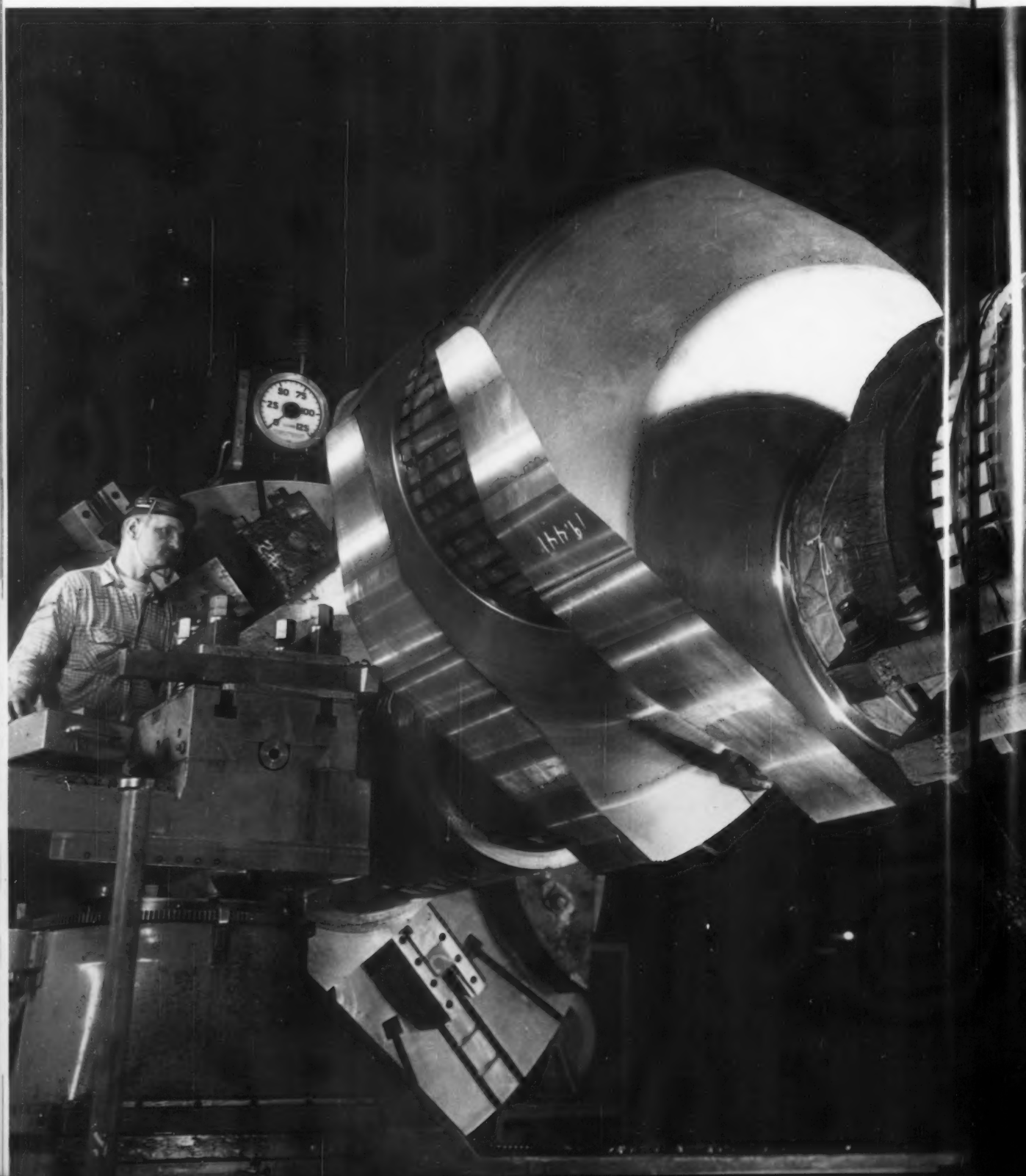
USS, MAN-TEN, COR-TEN, TRI-TEN and "T-1" are registered trademarks

Mr. Big hauls as much coal as 1½ railroad cars but weighs less than most 50-ton capacity trucks. USS Design Steels make the difference.

United States Steel Corporation—Pittsburgh
American Steel & Wire—Cleveland
National Tube—Pittsburgh
Columbia-Geneva Steel—San Francisco
Tennessee Coal & Iron—Fairfield, Alabama
United States Steel Supply—Steel Service Centers
United States Steel Export Company

United States Steel

"60 tons of counterweights de-shimmied this shaft"



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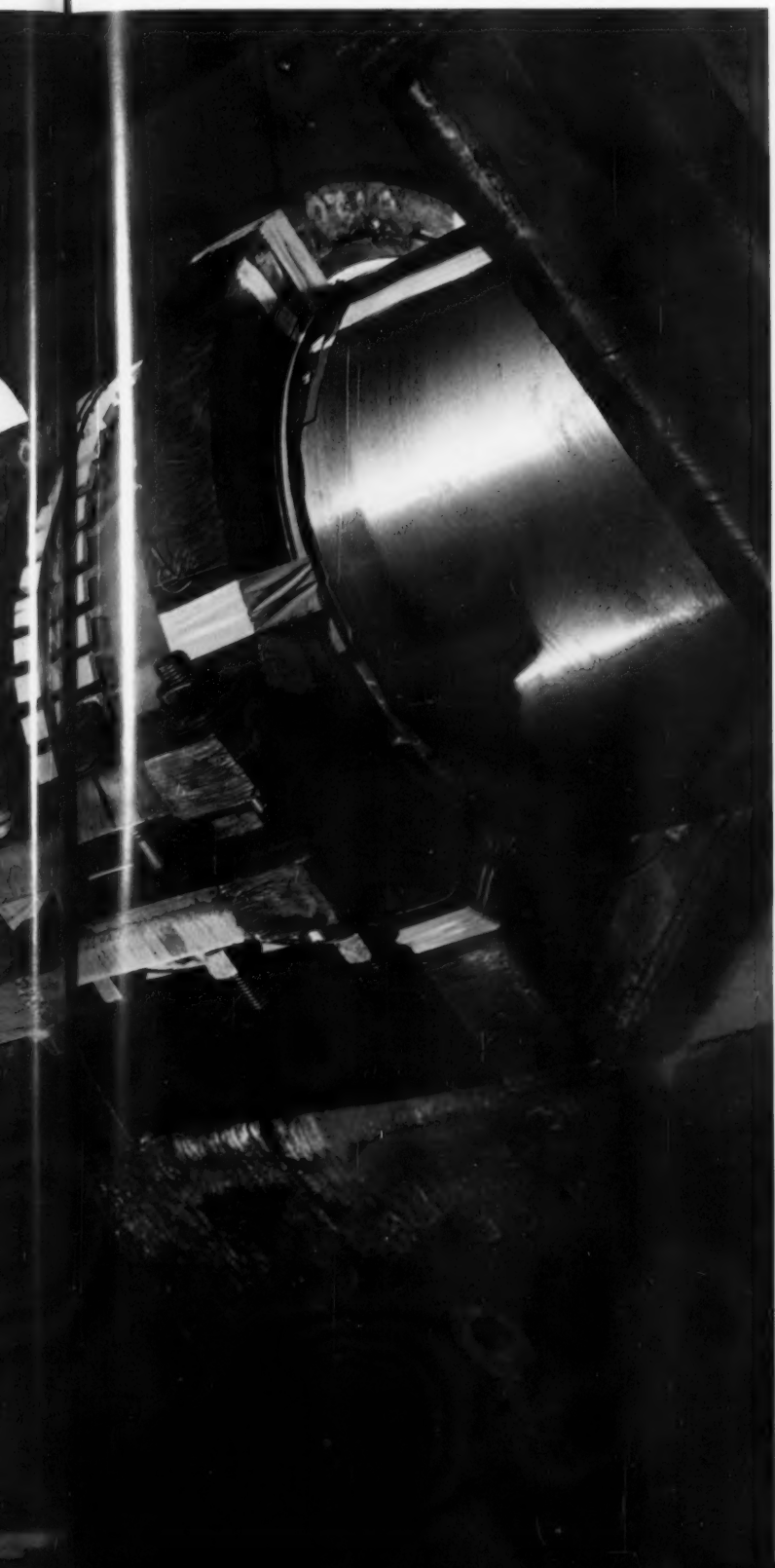
says A. H. McGurk, USS Machine Shop Foreman



Arthur H. McGurk has supervised a lot of uncommon machining jobs during his 30 years in the Forgings Division of U. S. Steel. But even he talks about this one:

It's a 30-ton single throw crankshaft for a vertical extrusion press. The German company making the press says that it's the biggest one-piece crankshaft of its kind ever made—more than 15′ long and almost 36″ in diameter at the main bearing journals. The "throw" section is about 31″ deep, and here, the crankpin journal is *42″ in diameter.*

We forged and machined this unusual shape from *one piece of steel*—a 110″ diam.-476,000# ingot of Ni-Cr-Mo-V steel that was double normalized and tempered to develop a tensile strength level of 120,000 psi. When the smooth-forged shaft was ready for machining on a 120″ lathe it weighed 72 tons, and it created a real problem. As it stood, the forging couldn't be turned on the lathe because the heavy throw section was off-center from the line of the main shaft. This eccentricity would tear the shaft from the lathe.

The problem was solved with three specially designed counterweights that totaled 60 tons. Collars were welded to the weights and they were bolted to the shaft so that it could be turned on either of its two centers without any whip. On a lathe and a planer-miller, the shaft was machined to tolerances of .001″.

Bearing surfaces were polished to a 63-microinch finish.

The rest of the machinery for this extrusion press was made in Germany, but U. S. Steel received the order for the crankshaft because the forging and machining demanded equipment and know-how that can't be matched anywhere else in the world. We'd appreciate your inquiries or requests for our free 32-page booklet about USS Quality Forgings. Just write United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania. *USS is a registered trademark*

United States Steel Corporation—Pittsburgh
Columbia-Geneva Steel—San Francisco
Tennessee Coal & Iron—Fairfield, Alabama
United States Steel Export Company

United States Steel

USS

Here is one of a fleet of forty Type 430 Stainless Steel tank cars that transport nitric acid. Built in 1956 by General American Transportation Corporation, these tank cars are still in excellent condition.

Leading the pure life—in USS Stainless Steel

A manufacturer's *second* biggest disappointment is to have his product rejected because it was contaminated during shipment. The *biggest* disappointment comes when the customer buys his next order from someone else.

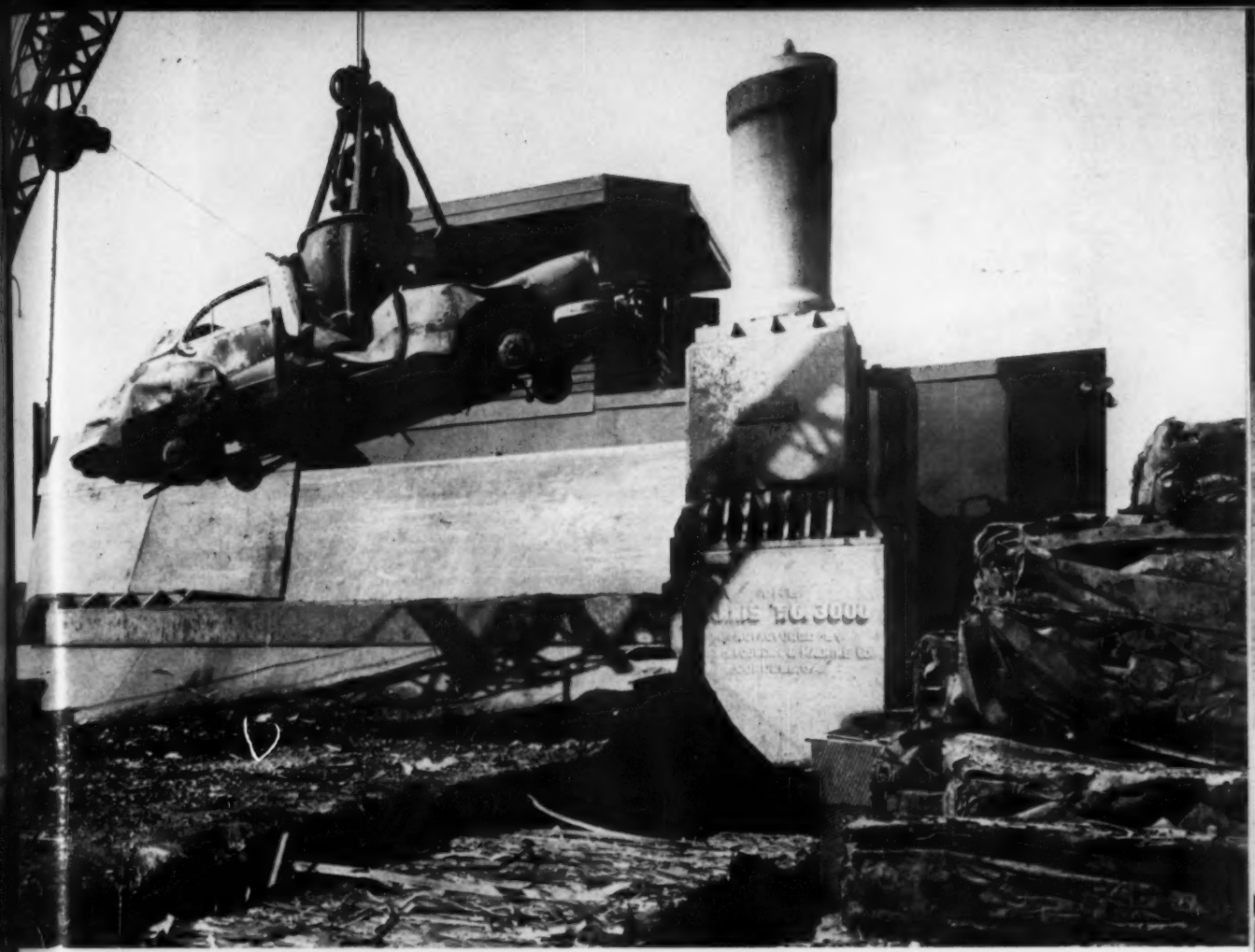
Manufacturers who ship or contain their products in Stainless Steel seldom worry about product purity. Many chemicals that eat away other metals have no effect on Stainless Steel. It keeps a smooth, dense surface that is easy to clean. No corrosion. No pits. No place for dirt to hide. And there's less danger of spoiling one batch with residue from another.

Because Stainless Steel is so strong, it can be used in thinner, lighter gages—reducing the overall weight of the container. But the real clincher is this: even though Stainless Steel costs more, there is no cheaper material in the long run. Specify USS Stainless Steel . . . through our nearest sales office or your local Steel Service Center.

USS is a registered trademark

United States Steel Corporation – Pittsburgh
American Steel & Wire – Cleveland
National Tube – Pittsburgh
Columbia-Geneva Steel – San Francisco
Tennessee Coal & Iron – Fairfield, Alabama
United States Steel Supply – Steel Service Centers
United States Steel Export Company

USS **United States Steel**

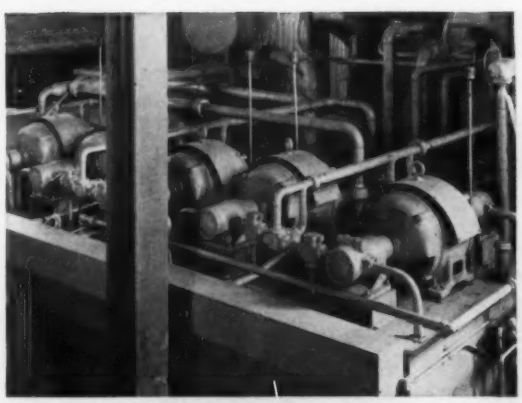


Smashing ¾ ton autos into 5 ft. bales

In a scrap salvage yard in Chicago, this huge press smashes automobiles into five-foot bales. Here's how it works. Stripped autos are shoved into a 20-foot press box. At the flip of a switch three giant plungers jam down with a force of over 1000 tons. Result: A compact bale, five feet long and two feet deep. About 30 cars an hour are run through this giant baling press.

Powering this mammoth machine requires sturdy motors. They have to deliver an instantaneous surge of power to drive home the huge plungers. Five Century Electric 100 hp motors do the job. Result: Plenty of dependable power when and where it's needed.

Century Electric application engineers have helped develop thousands of motor drive systems like this. And they can design the right drive system for your equipment because Century Electric designs, manufactures and applies motors and nothing but motors . . . your assurance of getting *more* than just a motor.



Five 100 hp Century Electric motors provide dependable muscle power for the huge press.

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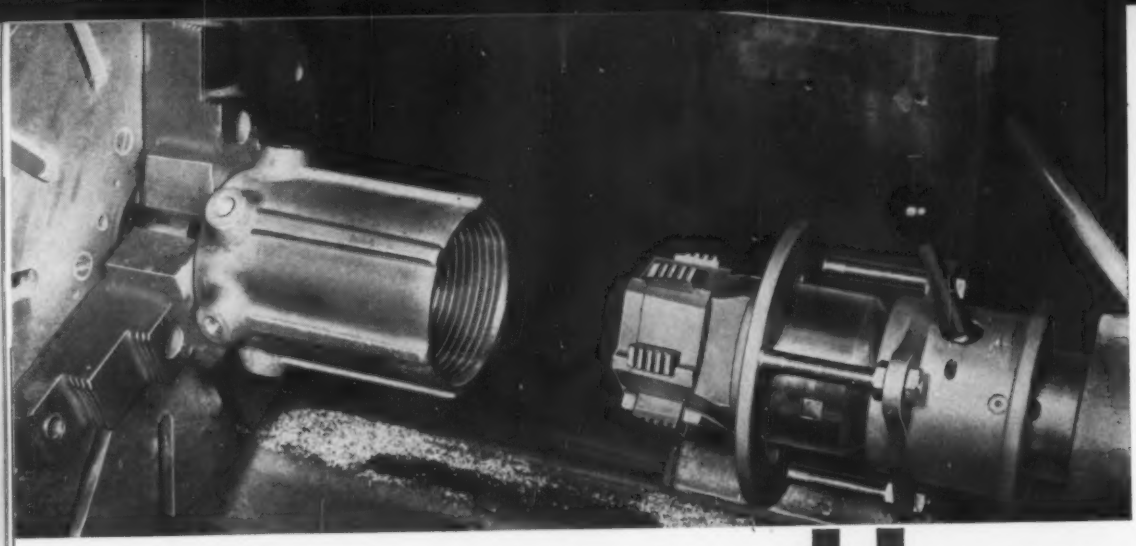
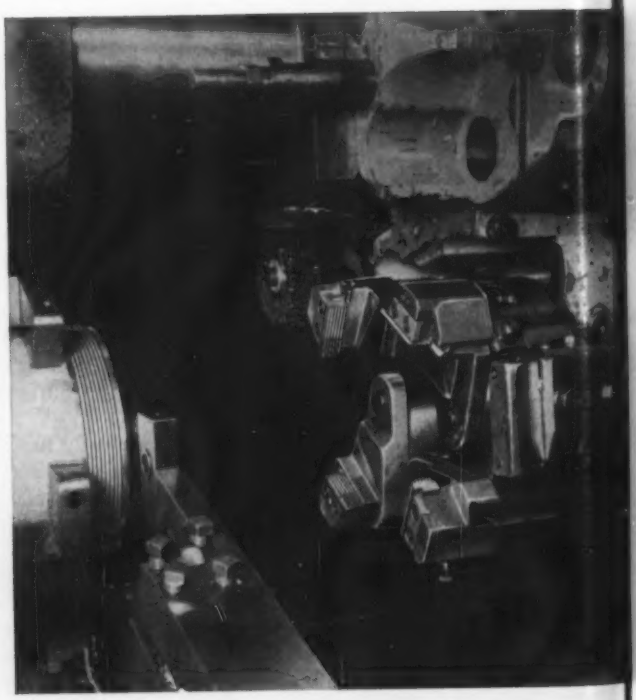
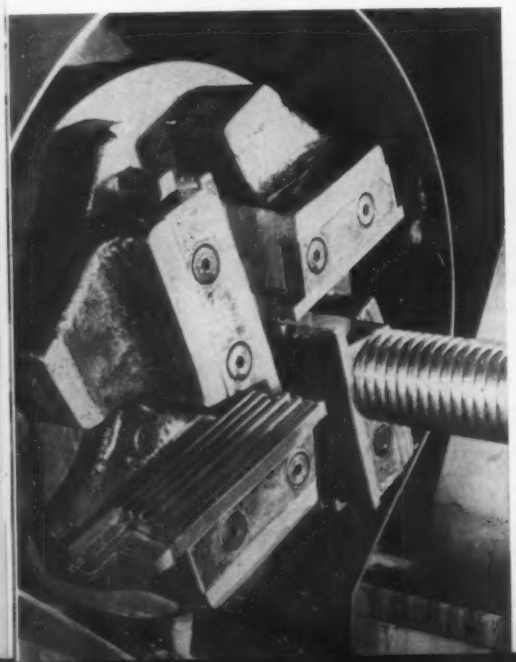


the world's largest selection of **thread**





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cutting tools

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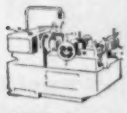
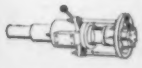

Threading Machines

Die Heads – Rotary & Stationary


Taps – Collapsible & Solid Adjustable

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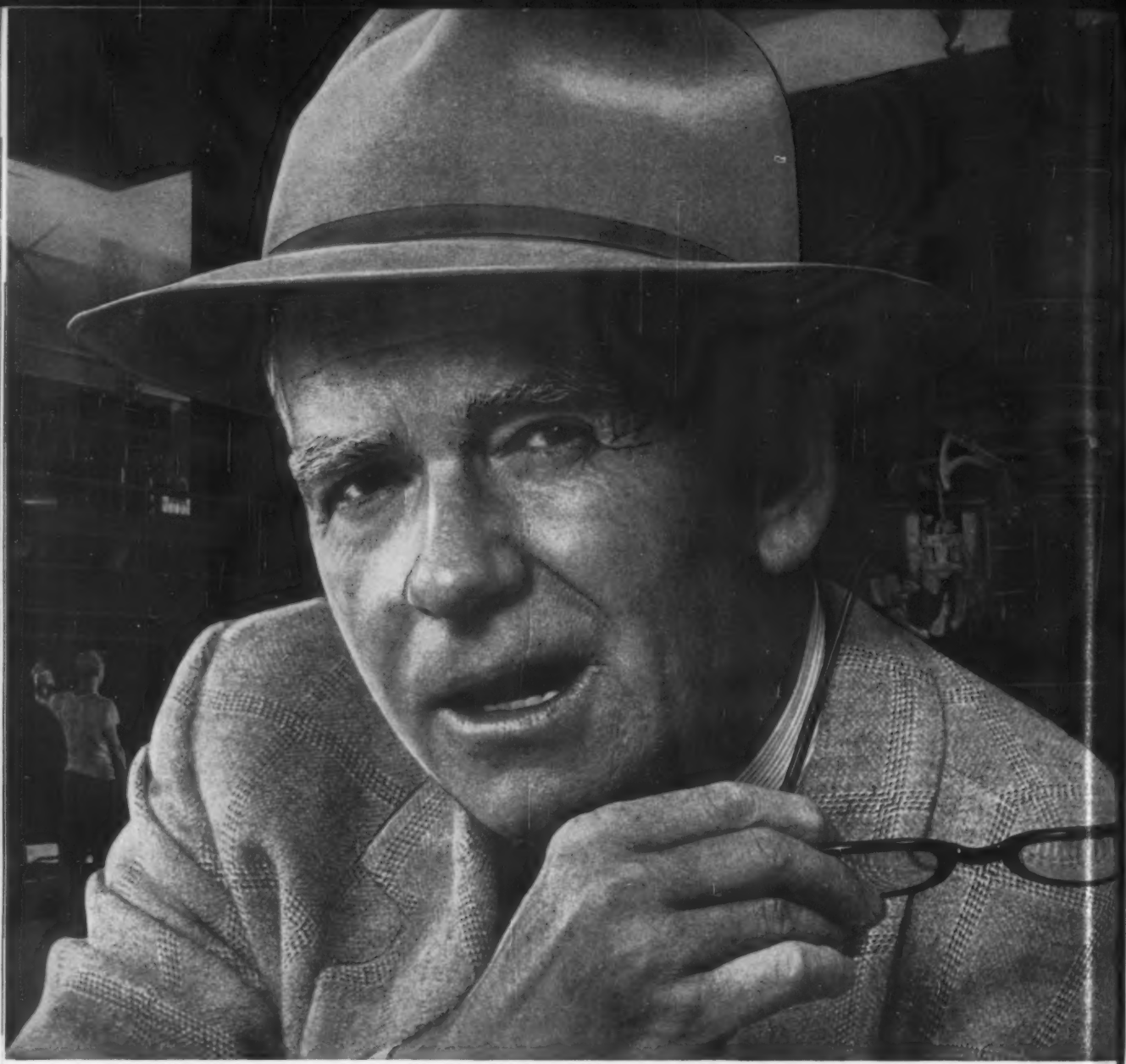

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Refined chrome combines the economy of regular charge chrome with the maximum cleanliness and low residual element content of conventional high-carbon ferrochrome. For facts on how refined chrome can reduce your costs, contact your UNION CARBIDE METALS representative.

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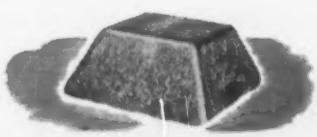

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WHEN TO EXPECT STEEL AFTER MILLS START UP is the key to almost every plant's plans. Mills hope to hit peak levels five weeks after startup. But this is admittedly optimistic. Most users will be lucky if they receive anything like normal shipments in that time. Damage to furnaces is still uncertain and can't be determined until fires are lighted and mills roll.

LOOK FOR MORE UNIFICATION of the 100-odd civilian and military missile and space agencies. This is the likely result of the resignation of Maj. Gen. John B. Medaris as chief of the Army's missile command and sharp criticism of lack of direction and coordination in U. S. missile programs.

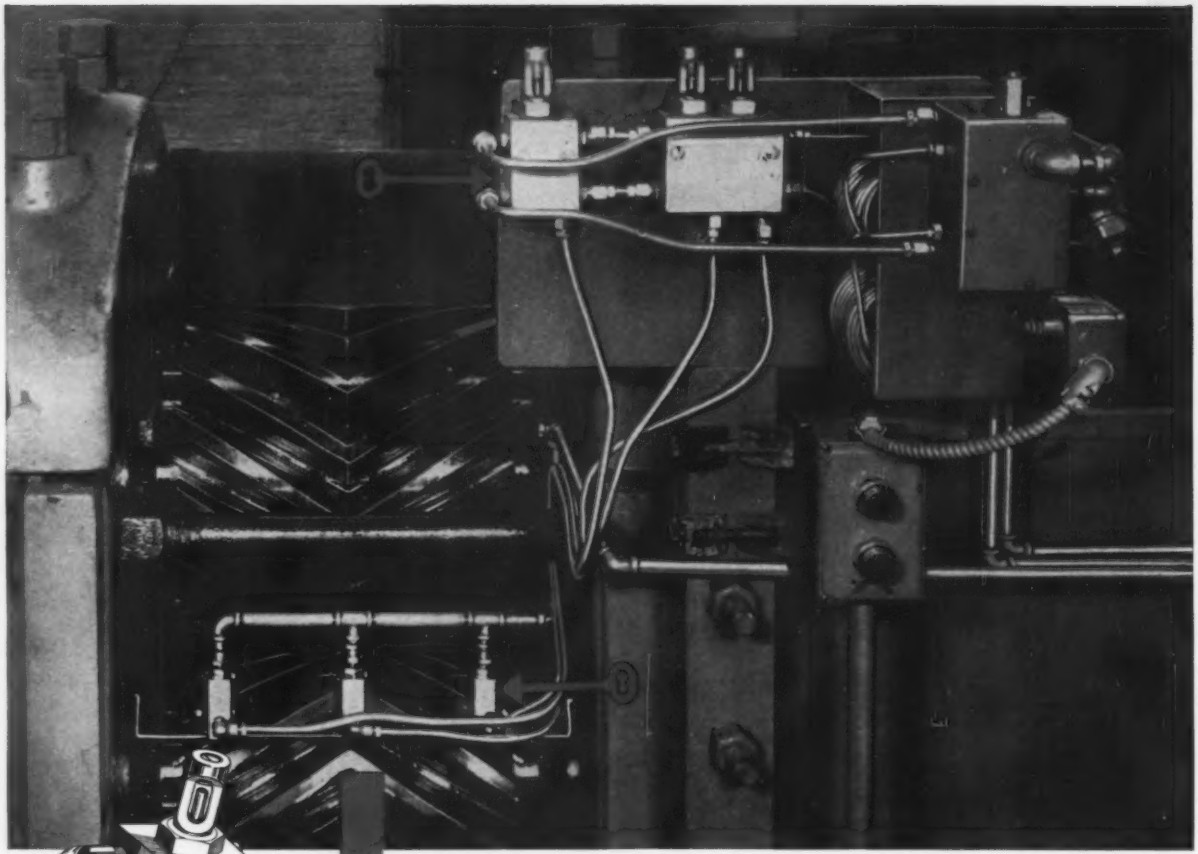
MACHINE TOOLS OF THE FUTURE will be able to perform at fantastic degrees of accuracy. Electrical engineers at the 11th annual machine tool conference heard that machining to the millionth of an inch will soon be commonplace. Tools some day may work in the size of the atom--one-hundred-millionth of an inch.

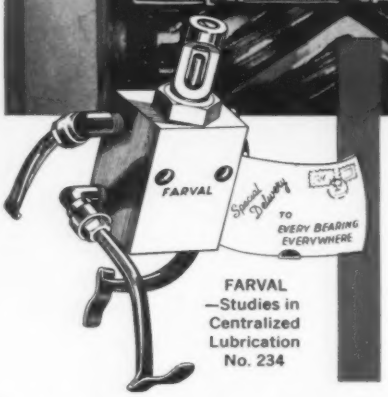
FOREIGN STEEL PRODUCERS ARE PLANNING to push expansion of flat-rolling facilities in the rear future. New projects include a tandem cold mill called the most modern ever built. Tinplate and cold-rolled sheet are getting the biggest push.

CUTS IN DISTRIBUTION COSTS should result from new standards for pallets established by the American Standards Assn. The number in use will be cut from about 300 sizes to only 11; eight of them rectangular, three square. This will result in major savings in packing, storing, and other distribution costs. The pallet business itself continues to grow. Sales of wooden pallets alone will exceed $50 million this year.

AUTO PRODUCTION IS NOW DROPPING SHARPLY and will continue to for weeks after the steel strike's end. Production last week dropped more than 20,000 from the previous week to a total of 111,487 cars. Truck production showed a proportionate decline.

CONSTRUCTION IS DROPPING OFF, probably because of a combination of tight money and the economic and physical effects of the steel strike. Private construction outlays dropped 3 pct in September. They normally hold at the August level. Residential construction dropped 2 pct, also more than the seasonal decline. However, physical volume of construction put in place through the first eight months of the year is about 14 pct ahead of 1958.





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No. 234

$715.00 savings in one year paid for this automatic Farval Spray System

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Inside Steel Negotiations

Why Collective Bargaining Failed

As the steel talks floundered in Taft-Hartley, the bitterness of the impasse stands out.

This is an analysis of how and why they failed, and of the issues.—By Tom Campbell.

▪ "Where do we go from here in steel?" That is the fateful question. Upon the answer hinge future industrial relations in steel, the life of the union and its officers, and the future of collective bargaining in America.

Kaiser Move—After 5½ months of negotiating and over 100 days of a deadlocked strike, the bargaining has to be called a failure. Even a settlement this week couldn't take away that stigma.

Early this week Kaiser Steel broke the solid front. This company, which has special circumstances as well as an aluminum negotiation to settle, broke off to make its own bargain.

Because of Kaiser's unique position, the break had little impact on the other major producers. An offer of a sort was made by the companies during the weekend as the steel companies and the union jockeyed for position in the final drive for settlement.

Final Issues—But two facts stood out: The union will insist that any company suggestion for a study of the famous 2-B language will not include any change in the specific 2-B wording in the contract. The union is determined that any study will be advisory, and not binding.

The companies aren't likely to give either. As one of the top negotiators put it: "We've got $500 million invested in this. We aren't likely to give up now."

It is being bruited about that if the language stumbling block is taken out of the picture, an economic agreement would be duck soup. It is true that if disputed language was out of the way, chances for a settlement would be brighter if new efforts fail this week.

It has been suggested that the President will call both sides to the White House and knock heads together. That is not likely. Both sides have been to the White House. How far should a President go with supplication?

Two weeks ago The IRON AGE

What Caused the Stalemate

Motivating Factors Behind the Impasse

The Companies

Real determination to fight inflation.

Sincere concern over foreign competition.

Desire to regain rights to manage which present negotiators believe were given away in past negotiations.

Desire for a standard industry contract. Contracts now vary among companies.

The Steelworkers

Need to fulfill pledge of big package.

Pressure to preserve hard-won gains.

Emotional impact of threats to seniority and local practices, plus fear of automation.

Conviction that government pressures will result in a favorable contract.

said that all approaches to a settlement had been exhausted by both sides. That meant voluntary approaches. There are other approaches which neither side wants —but which may come with startling suddenness.

Force Possible—There may be a so-called mandated settlement. But at this time no one knows what —if any—agency or governmental group could force an agreement. If such an agreement comes there will be an increase in steel prices —something that would blow the steel case sky high among steel firms, customers, and especially government.

The crux of this impasse is steel prices. Steel firms took the path of a fight against inflation and insisted on no wage increase at all for a year. That failed and the ultimate offer was language changes and a 10¢ an hour wage cost increase. There it stands pat, hard, and immovable.

End Result—The union gave also. But its last offer was a study of contract language and a wage-fringe increase it says is 20¢ an hour in two years (the companies say it's 33¢ an hour).

What is the likely settlement? If there is another steel strike Congress may settle the whole thing by law. Before that time, Mr. Eisenhower may decide with all the force of his office to put both sides to a test of his responsibility to the people. That could mean a settlement soon.

But it would have to be without language changes, says the union. The industry counters: There must be a 2-B change or arbitration. An economic package can be reached, but both sides may push each other to the worst possible position in all industrial history before there is a settlement.

Industry's Side

▪ The present company setup is trying to get a standard industry contract. In the past, some contracts have been more favorable than others. Although the firms are in a group, they sign individually.

For some years, U. S. Steel officials have been outspoken in their denunciation of yearly wage boosts as a cause of inflation. This year, the groundwork was laid by Roger M. Blough, U. S. Steel board chairman, to stop annual steel wage-fringe increases. He was joined and supported by 11 other major companies. And most of their customers supported them.

Plans Laid — Strategy was arranged and everything went well for the companies with their inflation battlecry. At the bargaining table the four-man team, R. Conrad Cooper, U. S. Steel vice president acting as chairman, flatly refused to give in to the union on any inflationary wage package.

Steel policy demanded a no-wage-increase settlement for a year. When that failed, company negotiators moved to a new tack: A demand for contract language changes before any economic package was discussed at all. This led to bitter statements by both sides. The union was totally unprepared to meet such a resistance and publicly accused the companies of not bargaining.

Not Like Fairless—Of course, this was not the type of bargaining that had been done by John Stephens, former U. S. Steel vice president and Benjamin F. Fairless, former board chairman of U. S. Steel. One of the first things Mr. Cooper told Steelworkers president David J. McDonald was to forget the past and face up to the new type of bargaining: This was the beginning of the bitterness between the two men. Time and again, Mr. Cooper discounted past bargaining methods of U. S. Steel.

About a month before the negotiations started in May, Mr. McDonald had been warned by a steel industry executive that he was no longer going to get the world with a fence around it. And Mr. Cooper didn't intend to give anything; not even any sense of friendliness mixed with normal cussedness that had gone before for years at the negotiation meetings.

KEY FIGURES: This famous foursome failed to see eye-to-eye. Left to right are Dr. George Taylor, chairman of the T-H board, Steelworkers' Goldberg and McDonald, and the industry's R. Conrad Cooper.

CAPITAL HUDDLE: Secretary of Labor Mitchell, with McDonald, above, reportedly had a lot to do with further delays in T-H machinery.

STANDING FIRM: H. C. Lumb, of Republic Steel, and J. S. Tennett, U. S. Steel, talk over the impasse with Cooper as mediation efforts broke down.

Machinery—Each day after the negotiations, Mr. Cooper reported to the coordinating committee of the 12 company industrial relations vice presidents. They, in turn, briefed their company head. Before the deadline, an intensive effort was made to sell Mr. McDonald on the need to agree to language changes and a non-inflationary wage-fringe increase.

Steel Gives — Changes in top policies were set by Mr. Blough and other chairmen. Often the men who met and talked were: Messrs Blough, U. S. Steel; Homer, Bethlehem Steel; White, Republic; Block, Inland Steel; Adams, Jones & Laughlin. At some of these secret meetings Mr. Cooper briefed, took part in discussions and argued for or against various moves.

This summit group set the stage for the "give." The last "give" was just before the final breakdown when arbitration of the 2-B clause was suggested. It will be this summit group which will decide how far and how long the 11 companies will go before there is a final settlement or a disastrous second shutdown.

The Eight Points—The biggest point of censure that some of the companies have against the group's action was the quick injection—with some apprehension — of the eight points (now three) into the hassle with a "we don't do anything at all unless this is settled first" attitude. When the strike came, the eight points were pushed by long technical letters to employees and by advertisements and public relations handouts. The result was bad for the steel side. The union succeeded in convincing most workers and union officials that the companies were trying to take away the "rights" of the workers. It was then that the holy war started.

Blough's Position—Although Mr. Blough refuses to take credit for the tightly knit industry stand, there is no doubt at all that he is the man who holds the key to the ultimate settlement. Whatever his company does eventually will be done by the others. At present, U. S. Steel is holding through hell and high water despite the certainty of future governmental baiting.

If the outcome is that gloomy and there is no settlement, or if there is a legislative settlement, Mr. Blough will have many more troubles not associated with labor agreements. Yet he seems little perturbed because he is sure his labor policy is absolutely right and will benefit the entire country.

Union's Position

▪ The union is also showing solidarity. But its back is to the wall. It has no fear that its members will not stand firm, but the cost to the workers is terrific. Only the fact that the steelworkers feel that the company is trying to turn back the clock on their hard-won privileges keeps the men in a do-or-die state of loyalty to the union.

Looking back, Mr. McDonald made his case more difficult by saying that he would get a bigger package than he did in 1956. Since there is "face" in union circles, this was a most unrealistic pledge. Yet Mr. McDonald conveyed through secret channels—in answer to feelers put out by steel industry officials—that he was willing to settle for a reasonable figure and did not desire a strike any more than the steel companies did. That was before he faced the 2-B decision.

Got the Message — When the IRON AGE first reported the industry's mutual assistance program (aid in case of a divide-and-conquer union technique) the union first came to believe that the industry was in earnest. This plan also generated the first glimmer of bitterness. While steel officials like to think their ideas and meetings are

MEDIATORS: The T-H panel made a valiant effort to bring out the issues. Members, from left, are Paul N. Lehoczky, Dr. Taylor, and John A. Perkins, all experienced arbitrators and mediators.

secret or limited in distribution, it would shock many of them to know that the secrets of the Duquesne Club in Pittsburgh have never been secrets—for long.

Mr. McDonald made many last minute attempts to settle the steel strike—on his terms. His able general counsel, Arthur J. Goldberg, put on all the pressure possible in Washington. Mr. McDonald's secret talks with Vice President Richard Nixon almost bore fruit, but here again lack of understanding caused misconceptions.

Attempts to by-pass Mr. Cooper, chief negotiator for the 12 companies, were a complete failure. Various "mediators" fell by the wayside. What Mr. McDonald and some steel people had hoped would be a speedy settlement was torpedoed by the size of the package Mr. McDonald wanted and by his refusal to allow any change in 2-B.

The fast appeal to Mr. Eisenhower produced a two weeks period of "grace." In that time, all kinds of attempts at settlement were made. Any and every means of contact within and without the negotiating group was attempted. Even in the last few days of the stay, with time running out, it looked as if saneness would prevail. But hemmed in by "face" and a real union fear of giving away rights of its members, the steel union called the strike they and the workers did not want.

At the Capital — As the time came near for Taft-Hartley invocation, real Washington friendships of Arthur J. Goldberg and David J. McDonald paid off. Vice President Nixon did what he could to relieve some of the pressure from Mr. McDonald. In other areas, Mr. Goldberg's relationship with Secretary of Labor Mitchell apparently got some more delays in T-H.

When the act was invoked, finally, further huddles by Mr. Mitchell and the President brought forth an inquiry board with top level arbitrators whose long record of settlements was impressive. Mr. Joseph F. Finnegan, Federal Mediation Chief (and an outstanding government servant) was instrumental in filling in the panel on the problems ahead.

For the first time, it became evident that the union's prestige had made it possible for the board to circumvent the real purpose of its appointment (to confirm an emergency in order to open up the way for an injunction) and thus to be used as a mediation forum. It was clear, though, that the steel negotiators had no more stomach for the board hearings than they had for previous mediation service efforts. But the union used the hearings as a public forum.

Injunction Delay—While the last stages of the union's act was in progress, its lawyers were making their case to delay the injunction. This they did, successfully. By now it was clear to all in the union camp that the steel side would not roll over and that the jig was up.

From the union's standpoint, the steel hassle is no longer a negotiation battle. It matches and surpasses the anti-inflation crusade on the steel side. While the steel side champions the inflation angle, the union side waves the banner of upholding workers' privileges won by hard fights over the years.

And, in the vanguard of the union officials who insist the union will never retreat on 2-B, are at least three former steel workers who remember when usurers were common in the mills, when laborers paid money tribute to the boss, when pandering was often a prerequisite for a raise.

Thus, the out of hand rejection of a 2-B revision goes much deeper than even Mr. Cooper suspects, and far deeper than most of the steel leaders (with probably three exceptions) would have any idea. It is a psychological fixation somewhat similar to the companies' attempt to recoup in a year what others in steel are said to have given away in 22 years.

Reprints of this article are available as long as the supply lasts. Write Reader Service Dept., The IRON AGE, Chestnut & 56th Sts., Philadelphia 39, Pa.

Mills Push for Early Shipments

But It Will Be Weeks Before New Steel Moves

Industry is hoping for normal shipments in three weeks. But the facts indicate this is on the optimistic side.

Extent of damage still has to be determined. And competition for new steel will be rough.

▪ As the steel industry and union inched closer to agreement early this week, interest shifted to the if's and when's of steel shipments.

Mills have set ambitious schedules, schedules that they, themselves, doubt they will be able to reach. One broad-based mill, for example, hopes to make normal shipments of most products by the third week after the strike.

Five Weeks Wait—But with allowances for industry optimism, and firm knowledge of ability of most mills to recover from damage incurred in the long strike, consumers can't hope for normal, balanced shipments sooner than five weeks.

Steel mills can't get up to 85 pct of ingot capacity inside of two weeks. It will take at least three weeks more before finished products start to move from the shipping docks in a normal flow.

But some steel will start to move shortly after steel workers are on the job. It will probably go to the users it was originally scheduled for. But there will be allowances for the critical status of major users.

Consumer Viewpoint — Here is how one big consumer of flat-rolled steel sees it:

This plant, a major automotive stamper, hopes to resume operations three weeks after the strike ends.

"We know it may be four or five weeks after the strike ends before we can start our lines, but we are going to try for three. We have obtained delivery promises on every order of steel. If they hold up," an optimistic spokesman says, "we'll have enough to operate in 18 days."

It should be pointed out that this plant is in a most favored position. This means geographically, and in terms of influence. Small users will find themselves far behind this schedule.

New Steel Schedule—For the first three weeks of the startup period, shipments will be largely steel that was scheduled and started before the strike. Mill spokesmen won't be tied down on the exact shipping sequence, but there is a limit on how much schedules can be changed in the middle of processing.

The first shipments will be very light. It will take about three weeks at the earliest before new steel begins to come out of mill pipelines. Most hot-rolled products have a production cycle of three to four weeks. The normal cycle for cold-rolled sheet or tinplate is six to seven weeks.

Damage to blast furnaces and openhearth furnaces is still to be determined. And extent varies with the mills. As colder weather comes along, complications will increase. Generally, mills have been blessed with mild weather.

Other complications include damage to fuel, water, and power lines. Utilities are a critical factor as mills start up.

Consumers can expect little help from warehouses in the scramble for post-strike steel.

The service centers have only about 1.5 million tons of steel on their racks. And this is largely little-used items. But some struck warehouses will have steel to ship.

WHAT ABOUT T-H? Strikers at U. S. Steel's Homestead Works are typical of union's opposition to Taft-Hartley injunction.

FINANCIAL TALKS: Chief Festus Okotie-Eboh, Nigerian Federal Minister of Finance (left), discusses his country's development with Eugene Black, president of the World Bank, and Sen. Prescott Bush.

Africa: Time to Tap Its Potential

Africa, with its growing economy, is anxious for U. S. industry to explore its markets.

Now is the time for American investors to take a careful look at what Africa has to offer.— By N. R. Regeimbal.

▪ Dark Africa, now slowly awakening, is expected to become an economic market giant in a few years. It may already be a billion-dollar market that's going begging.

The southern countries of Africa hold promise of developing as a sizeable market for U. S. equipment manufacturers. Consumer goods producers, particularly for those who have had their normal export markets raided by foreign countries in the past few years, should find booming markets.

Nigeria typifies the possibilities for U. S. firms. It has a population of 40 million and a national income from exports including tin, rubber and petroleum products of $2.75 billion a year. The Nigerian government now has credits in English banks totaling some $400 million.

The country is literally begging to see U. S. salesmen. But they'll have to bring more than their order books.

Nigeria, as the other countries of Africa, needs know-how before it can buy.

Plentiful Opportunities—A two-man team from the U. S. Small Business Administration which returned recently from Nigeria, says that a firm, or a pool of several firms, could reap a bountiful harvest in Nigeria. After a market survey (which can be secured free through the Rockefeller Foundation), a handful of engineers in a year could set up the plants, train the workers, and count up the profits from a relatively small investment.

The country needs a wide range of plants to produce consumer goods, farm equipment, and process its raw materials into exportable products.

In metalworking, machinery to build metal doors and windows, metal curtain walls, extruded metal sections, corrugated metal sheets, metal tubes, metal scaffolding and furniture, kitchenware, household utensils, and all types of fasteners are desperately needed.

African Needs — They also urgently need equipment and training for service and repair industries. For instance, this relatively backward country is now importing an average of 800 automobiles a month. But there are few repair

facilities. Printing also is a large industry, but service is lacking.

Nigeria is strongly anti-communist and, as a long-time English protectorate, somewhat anti-European. It is looking to this country for its purchases.

For several generations the government has been sending several thousand young men a year from the old slave capital to the best universities in Europe and America. From this small nucleus of highly educated persons, the bulk of the country looks for leadership.

Government Builds — The government has taken the lead in trying to establish industry with liberal financial and other aids. It tries to attract suppliers to help them set up plants, which are then turned over to private Nigerian investors.

Nigerian professional men and others with money are begging to invest in Nigerian industries. An American firm would need to underwrite only the selling effort, including the training, to open this market.

Steel Challenges Aluminum

The Competition Is for Ultra-Cold Markets

Steelmakers are ready to meet aluminum head on for a share of cryogenic (ultra-cold) markets.

Their entry is a nine-pct nickel steel.—By G. G. Carr.

• Steel is girding for an all-out assault on the cryogenics market—applications where the metal will be subjected to ultra-cold temperatures.

Steelmakers share the aluminum industry's optimism over the potential of this field, are claiming that "anything aluminum can do we can do better" (IRON AGE, Oct. 16, P. 65).

Cold Steel—Current entry of the steel industry is nine pct nickel steel, ASTM A-353. This alloy, actually developed some time ago, was stunted in its early growth by a nickel shortage. With nickel now ample, A-353 is emerging as a major challenger for cryogenic applications.

Steel producers are emphasizing its combination of strength and resistance to brittleness and fracture at temperature down to —320 degrees F. They believe it is particularly well suited to tonnage applications as liquid methane (—258 degrees F), liquid oxygen (—297 degrees F) and liquid nitrogen (—320 degrees F).

Costs More—Steelmakers admit the initial cost of their entry in the cryogenics market is higher than aluminum's. But International Nickel, which actually holds the patents on the nine pct nickel-steel, claims fabricating and welding savings bring the final cost at least 10 pct under a comparable aluminum installation.

Aluminum producers tell The IRON AGE they have not yet seen enough field test data to make a realistic comparison. But they are still convinced some of their biggest new applications will come in this field.

Inco makes its patent readily available to steel mills. Currently, U. S. Steel and Lukens are the licensees.

How to Weld—Best welding results are obtained with Inco-Weld coated electrodes or wire of a high nickel - chrome - iron composition, says Inco. Inco-Weld "A" electrode is recommended for manual welding and "A" wire for inert gas-metal arc welding.

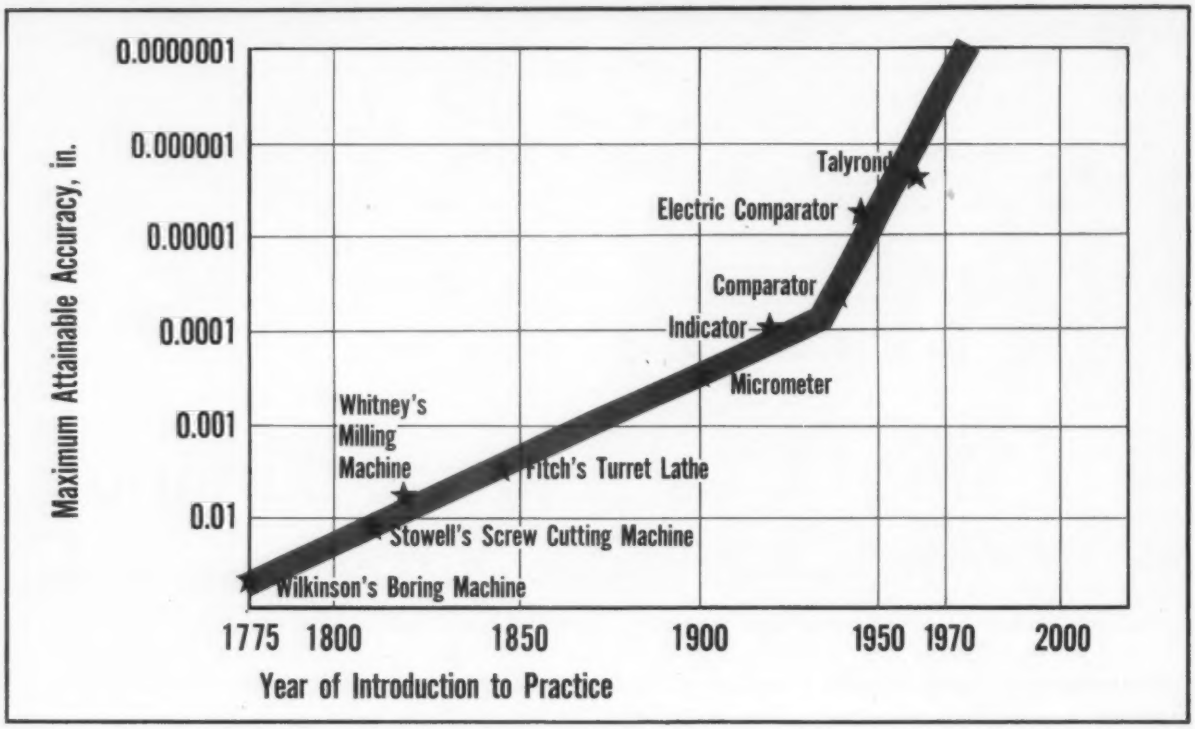
Welds made with 25-20 Chrome-nickel stainless (type 310) are also satisfactory, says the nickel company, but of somewhat lower strength than the plate metal. However, the company hopes to develop even better welding material in the near future.

Impact Strength—The minimum impact strength for this steel at —320 degrees F is 15 ft-lb, Charpy keyhole notch test. The minimum tensile strength is 90,000 to 95,000 psi, and yield strength is 60,000 to 65,000 psi.

Recommended heat treatment is double normalizing at 1650 degrees F and 1450 degrees F, followed by reheating at 1050 degrees F. Time at normalizing temperature ordinarily is one hour per in. of plate thickness. Time for reheating is a minimum of two hours for thicknesses to one in., and one hour for each additional inch.

The steel is also available quenched from 1450 degrees F and tempered at 1050 degrees F. Inco says the quenched and tempered gives equally good results in most if not all uses.

More Accuracy in Metal Removal



A Look at Tools of Tomorrow

Electrical Engineers are told what to expect in future machine tools.

This includes hot machining, ultra high-speed cutting, and electron beam machining. — By T. M. Rohan.

▪ Machining with jets of liquid—or with tools moving at 100,000 fpm —or by electron beams—were some of the crystal ball ideas explored in Cleveland last week.

A capacity crowd of electrical engineers turned out for the 11th annual Machine Tool conference of the American Institute of Electrical Engineers, and got a glimpse of the future.

Up to the Atom—Although millionths of an inch machining is not uncommon these days, a top research man went a step farther and predicted we will soon be hitting the limit—the size of the atom—about one one-hundred-millionth of an inch.

"Whether we can go much beyond this in machining is highly doubtful so that we may finally be reaching an end-point here," said Eugene Merchant, director of Physical Research for the Cincinnati Milling Machine Co.

A recently discovered, but classified improvement in cutting tool geometry at Cincinnati Milling is expected to greatly extend tool life in carbide milling high strength steel. The new tool is believed to be "a multi-stage with various cutting edge angles. This would take several cuts at once, and the shape of the tool could be adjusted.

Machine It Hot—Another frontier pointed out by Mr. Merchant is hot machining. An induction heater ahead of the tool heats the material locally to about 1200°F. This makes it easier to machine. Mr. Merchant pointed out hot machining has tripled cutting speed and could double it again in 10 years.

Very high speed cutting, about 15,000 fpm, may be easier on the tool than present top speeds. Experiments are now going on at 100,000 fpm. Better cutting fluids hold less promise of increasing cutting speeds, says Mr. Merchant, because they have only improved 20 pct every 10 years. Grinding improvements have showed gains of 40 pct every 10 years.

Other Improvements—New stock removal methods—electrical, chem-

ical and physical—work as well on tough steel as mild steel, according to Mr. Merchant. Electro-chemical machining (reverse of electro-plating) has had a four-fold improvement in rate of penetration in the past 10 years and promises at least that much in the next 10, he said.

Electron beam machining, in which surface metal is vaporized by a focused beam of concentrated high energy electrons, may be the fore-runner in intricate precision machining jobs. At 100 kw this will slice a slot through one-eighth in. stock at up to 60 in. per min. And it will hold an accuracy of plus or minus 0.0001 in. across a slot 0.040 in. wide. Contouring cavities it will hold accuracy in depth to plus or minus 50 millionths of an inch.

Electronic Method—Plasma jet machining is another electronic method holding promise, according to Mr. Merchant. A concentrated electric arc in a slender beam vaporizes the surface of the metal. It will make a cleaner cut than ordinary flame cutting, says Mr. Merchant.

On the "outermost fringes" reached by the Cincinnati Milling researcher in his flight is high velocity liquid jet. Water or another liquid is squirted at metal at extremely high speeds, possibly with some abrasive added.

Roll-forming has come up fast in recent years says William H. Busch, Floturn Div. manager for Lodge and Shipley Co., Cincinnati. Over 22,000 parts have been made for Pratt & Whitney jet engines.

Some copper artillery shell cones for 105 mm shells are turning out 120 pieces per hour at Weatherhead Co. in Cleveland, and Firestone in Akron. Floturns there are operating 22-24 hours per day.

For and Against—Floturning is in the peculiar position of competing with deep drawing and also working in conjunction with it on the "Flo-Reform" process. In this, parts are roll formed then drawn. One forming and two draws do the equivalent of 7 to 10 draws without heavy drawing equipment.

Army Space Experts May Shift to NASA

Administration wants to shift Army missile team, headed by Dr. Wernher von Braun, to civilian space agency.

Congress will receive proposal early next year, but may give it careful study before acting.—By R. M. Stroupe.

▪ U. S. efforts to explore upper space may gain renewed push from the National Aeronautics and Space Administration.

If Congress is willing, this civilian agency will soon get authority to direct the Army's vaunted missile team. The group, headed by Dr. Wernher von Braun, is the research nucleus of the Army Ballistic Missile Agency at Huntsville, Ala. Officially, this team can be transferred to NASA early in 1960.

Ike Proposes—President Eisenhower hopes to give Congress a persuasive argument for this action. He can be expected to stress the importance of bolstering national space research by using the best available manpower and technical skills in this effort.

Congress will receive his proposal in January. Unless the lawmakers reject the transfer plan, it can take effect 60 days later. NASA and Army representatives are drafting the details of the transfer.

Von Braun Willing: Dr. von Braun has indicated his pleasure at the opportunity to work with NASA. Maj. Gen. John B. Medaris, top Army commander at Huntsville, though he has disclosed plans to resign, says he is sure a workable arrangement for reassigning Army space missions can be developed.

However, some adverse reaction may come from Capitol Hill. A full-scale inquiry into the benefits of the transfer, by space and armed services committees in Congress, is a possibility.

Why It's Needed—But the U. S. will spend about $800,000,000 in this fiscal year to learn more about space. There are many important reasons why, according to T. Keith Glennan, director of NASA.

These include:

Contributing to the defensive strength of the U. S.

Countering Communist propaganda based on Russian space achievements.

Gaining new knowledge about weather, communications, navigation, and the science of the planets.

Other benefits: Extending man's frontiers through space exploration, "incidental" rewards such as new products and new methods, and the prospect of finding life on other planets.

Saturn Project Shift?—One of the more highly-publicized projects to be shifted with the team of rocket experts is Saturn, a multi-stage rocket engine. This power plant, planned to develop 1.5 million pounds of thrust, could give an enormous boost to U. S. space vehicles. But it may not be completed before 1962 unless the project can be speeded greatly.

The Army spent $34 million for work on Saturn in the year ended last June 30. In the current year, the Saturn program calls for spending of $70 million. While NASA might be able to program more funds at an early date for this project, it is uncertain that the engine work can be accelerated much beyond the present rate.

Foreign Ore for Midwest Mills

NEW ROUTE: Foreign iron ore now flows through the Burnside (La.) Bulk Marine Terminal on its way to the steel mills of Chicago and St. Louis. The trans-shipment facility is operated by Ramsay, Scarlett & Co., Inc., of Baltimore. Dravo Corp., Pittsburgh, built the unloaders (background).

Army to Restudy Stand on Tanks

Revisions in the Army Plan for hot-war production of tanks must be restudied, following disapproval at the Defense Dept. level.

Congressmen in the Delaware-Eastern Pennsylvania area became alarmed this year by the threat of a shutdown of the Lenape Ordnance Plant at Newark, Del. The Army proposed transferring M-60 tank orders from Newark to the Detroit-Lima, O., industrial complex.

Immediately affected would have been the production of about 720 of the M-60 tanks, the newest in the Army medium tank class. But on a longer-range basis, the Army is concerned with output facilities for up to 500 tracked vehicles per month. Units to be built include tanks, tank retrievers, and engineer-type combat vehicles.

But this plan for moving assembly of the medium tanks would have resulted in the loss of hundreds of jobs at Newark. Protests raised by Sen. Frear (D., Del.), Rep. McDowell (D., Del.), and others apparently helped the Defense Dept. decide to reject the Army plan. The Army now is restudying its arrangements for getting armored vehicles both this year and in wartime.

Jessop Forms Warehouse Div.

Jessop Steel Co., Washington, Pa., has formed a nationwide warehousing division with headquarters in Chicago.

Frank B. Rackley, president, said the new Service Centers Div. will operate separately from the company's established sales organization and distributor system.

The consolidation will include the Jessop-owned warehouses in Chicago, Los Angeles, Detroit, Wallaceburg, Ont., and at the company's main plant.

The new division moves Jessop beyond the specialty and alloy steel field for the first time. The new warehouse system will stock a wide range of general steel warehouse items.

A. J. Kueber, president of Steel Warehousing, will be in charge of the Jessop's new Service Centers Division. He is a national director of the American Steel Warehouse Assoc.

Canadian Progress Shown in Chicago

The Canadian exhibit at the National Metal Exposition and Congress in Chicago, Nov. 2 to 6, will provide a first-hand look at that country's status as a modern manufacturing nation.

H. J. Horne, Commercial Consul for Canada in Chicago and director of the Canadian display, says the exhibit offers "ample evidence" of the progress made by Canada in metals and machinery in recent years.

Among items in the field of nonferrous metals shown are aluminum ore sample, copper, magnesium products, silver, gold, titanium, zinc, uranium and nickel.

Machinery includes a precision assembly unit using a die-casting method. In milling machines there are an automatic contour, a vertical with tracing attachment and a ram turret milling machine.

First Southern Sub

The USS Blueback, first submarine to be built in the South, was officially commissioned by the U. S. Navy at the Pascagoula, Miss., shipyard of Ingalls Shipbuilding Co.

The ship's radically new design is similar to the Albacore type teardrop hull. It has only one propeller.

Photo courtesy of Cities Service Oil Company (Delaware)

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A specification sheet showing complete details is available on request. Simply write: Triple Stage Upright, Clark Equipment Company, Battle Creek, Michigan.

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Donald W. McArthur

A New Use for Microfilm

The use of microfilm and punch cards for recording engineering drawings is becoming widespread.

Donald W. McArthur, general manager, Filmsort Co., developed the method.

▪ The method of using microfilm and punch cards for recording engineering drawings is fast becoming highly accepted. And the man responsible for the success of the process is Donald W. McArthur, general manager of Filmsort Co., recently acquired as a division by Minnesota Mining and Manufacturing Co.

For years Filmsort's aperture cards have been used for such things as criminal identification by police, recording claims by hospital-insurance groups and as a reference technique for engineering drawings.

DONALD W. McARTHUR: His process brings bigger returns.

For Best Results—Their use was widespread, but Mr. McArthur was handed the assignment of developing the use which would bring the biggest return for the firm. Reasoning that the engineering drawing is the key to every manufacturing process, his decision was to research this use to the fullest extent.

In 1957 he organized a seminar of major government and potential industry users. Through them he discovered needs and requirements if they were to use the process in their organizations.

Perfecting a Method—Having the blueprint for the future of the microfilm aperture card, he went to work with his staff to perfect a method of documentation. Not only did filming of the drawings have to be considered, but also a system by which they could be filed and still be readily accessible.

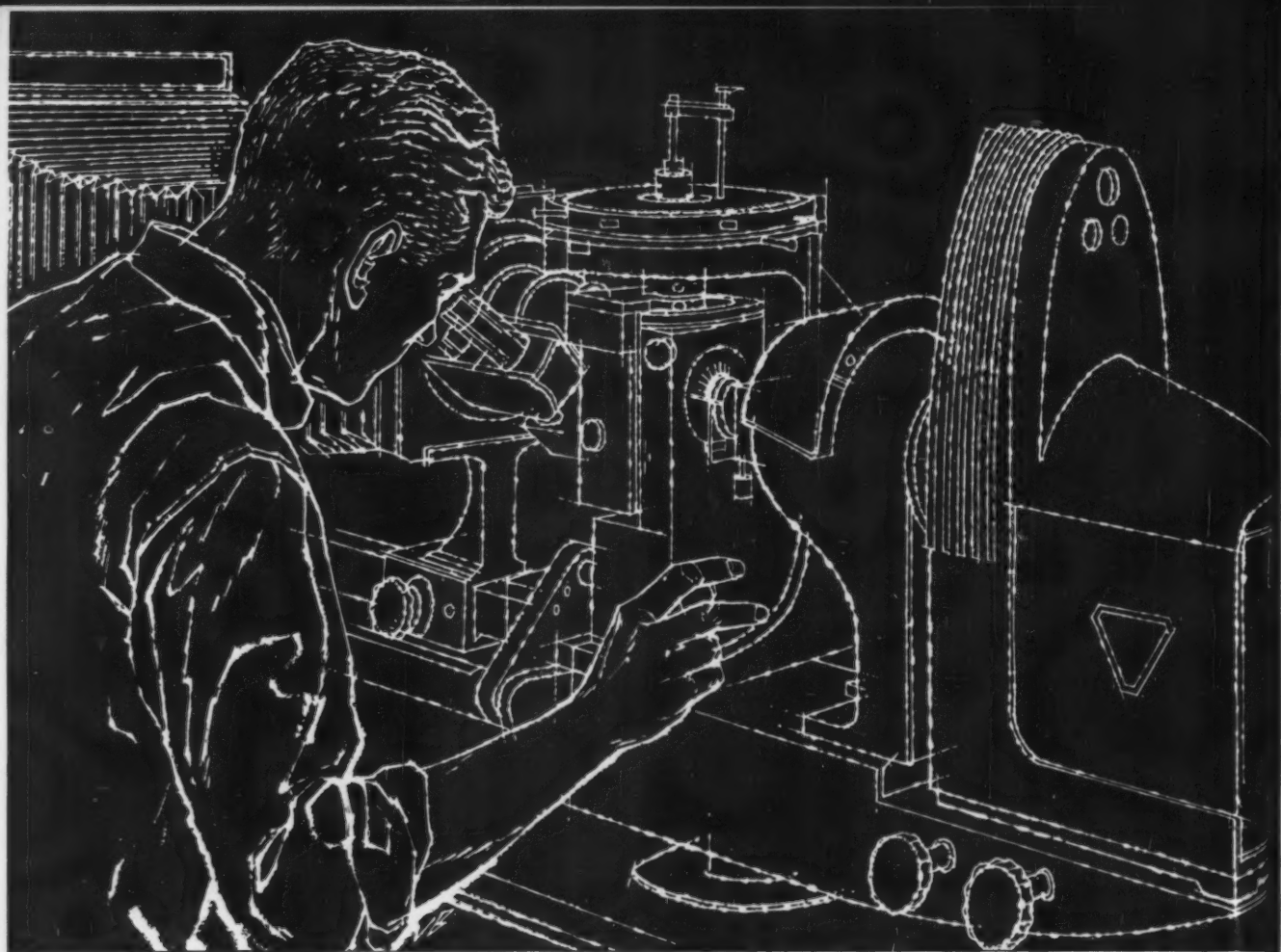
Today, the use of a piece of microfilm and a punch card is becoming the new standard for engineering documentation. Government committees in the Dept. of Defense are at work setting up requirements for the process to be used in defense projects.

Benefits of the system: Less cost, versatility, quality, reproduction, accessibility, protection for drawings and reduction of storage space. Not only can the drawings be enlarged on a viewer or on coated or plain papers, but prints in reduced or original size can be made easily. The prints can be made on paper, cloth or film transparencies.

Duplicard—In the same line, Filmsort has patented the Duplicard. This is an aperture card with a factory-mounted frame of unexposed dry film. Using the Duplicard, a drawing can be copied from the microfilm in less than a minute.

Mr. McArthur, a native of St. George, Utah, has played the leading role in the development of these procedures. He began working with Filmsort in 1949 as chief engineer. During the past four years he held his present post in the company.

He is active in the National Microfilm Assn.



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How Much Boom After Strike?

Inventory re-building will play important part in economic gains after the steel strike ends.

But there's some concern about the thrust of other spending factors.

▪ Has the steel strike taken the bloom off the boom? When the mills start producing again, the economy will come out of its deep freeze. Some of the momentum lost since July will be regained.

All the needed economic drives are still present. Consumer demand, despite the strikes and layoffs, is still healthy. Inventories, after the strike's drain-off, are badly depleted. Industrial spending plans are on the increase. Buyer interest in the new cars adds another push.

Inventory Buildup — Inventory re-building—either of steel or the products made from it—will make little headway if steel mills operate under the Taft-Hartley injunction. Reason: A maximum output of about 14 million tons will be produced. This won't equal the amount needed for actual use.

Steel consumers will eventually try to re-build stocks to around 20 million tons—slightly under the level before the strike. But this will have to wait until the mills are operating under a new labor contract. Because of this, the inventory build-up will be a more important influence on the economy in early 1960.

Question Marks—Other factors in the boom are more difficult to predict. Some of those counted on most heavily—consumer spending, automobile sales, capital spending —are tied to another influence: Tight money.

How much restraint the credit pinch will cause is still not clear. The home construction industry is already worried about its effects. So are the makers of all the appliances and goods which go into new homes.

Actual work on capital spending projects has been held up, in some cases, by the strike. But, here too, some doubts may be creeping in.

Some economists believe present capital spending plans are more deep-rooted than those in previous booms. They indicate these plans are aimed at improving production, not boosting capacity. But for that very reason they may get more careful review. Certainly the anemic earnings now being reported by steel companies may result in some economic soul-searching.

Plan Future Labor Needs Now

▪ In planning ahead, you will do well to review your manpower needs. There will be important shifts in the labor force in the next ten years. Some are already at work. Population changes make others inevitable.

There will be a decline, for example, in the number of people in the prime labor pool—the ages from 35 to 44. This will come when manpower needs are increasing. It will occur when business will be demanding more highly skilled workers. And while new skill needs are developing rapidly.

Some Second Thoughts—Industrial training programs are going to require a lot of overhauling. There will be more emphasis on re-training older workers.

Flexibility of labor to meet the new needs will be important. But, the training efforts of business—and the labor unions—often operate against this mobility. These efforts are aimed at holding on to workers, reducing turnover, and maintaining the status quo.

"This interest," says William A. McDonnell, chairman of the board of the U.S. Chamber of Commerce, "is sometimes in conflict with the broader economic interest in shifting workers to the place, job, and skill where they will obtain the highest economic return."

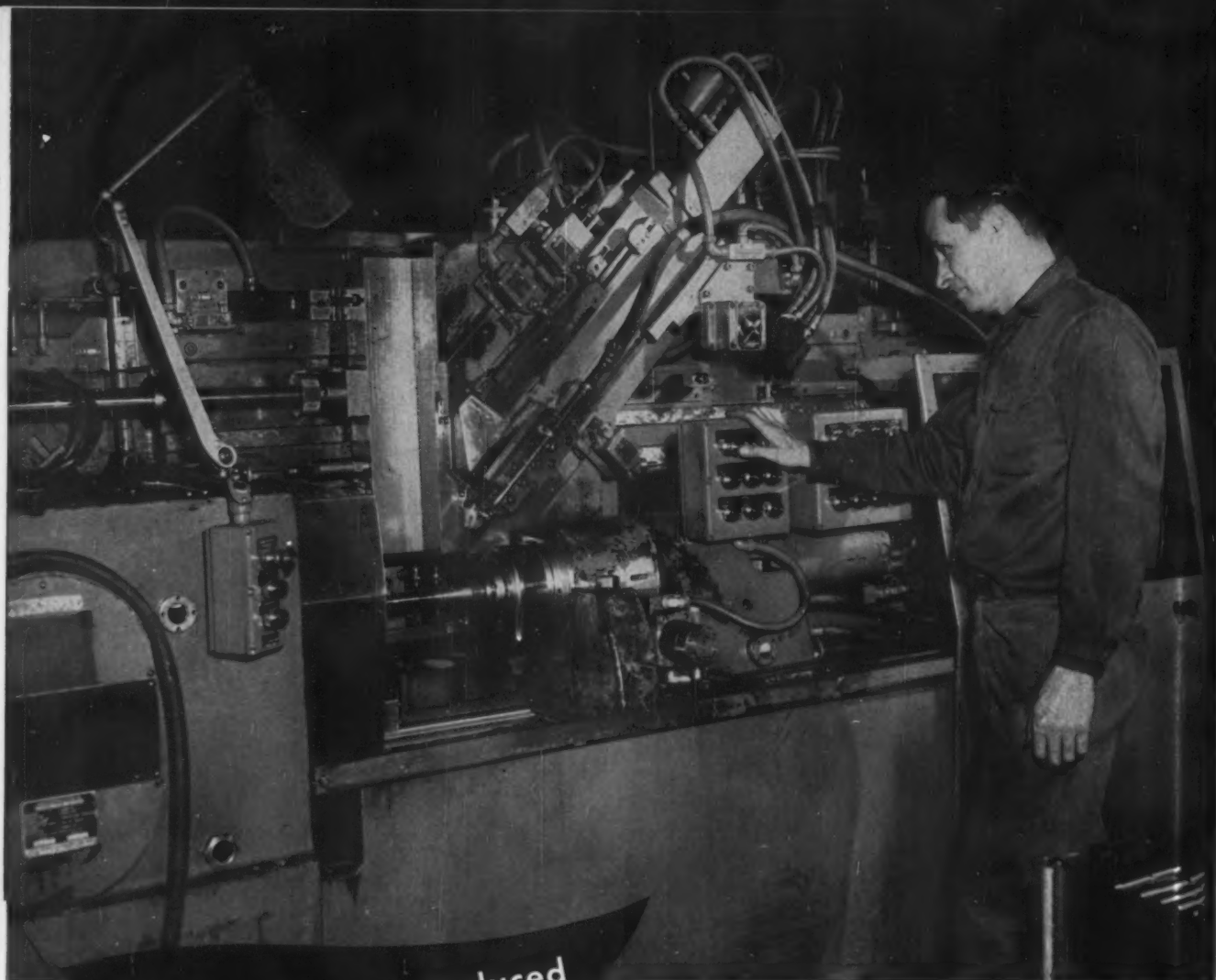
Eye on the Future—In addition the company or union "may not be best prepared to predict future skill demands," he points out.

What's the solution for business? Let the schools concentrate on the main job of training skilled workers, says Mr. McDonnell. He adds, "It is the job of business—by expanding, by developing new products and services, and by investment—to provide the jobs."

New Freight Car Deliveries Slow

New freight car deliveries dropped during September. Backlog of cars on order and undelivered as of Oct. 1 was 35,626, compared with 37,172 the previous month.

Actual deliveries of new cars to the nation's railroads in September were 2481, contrasted with 4890 in August.



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New Small Cars Aren't All Alike

Each Automaker Has a Different Goal in Mind

Each of the new small cars has particular merits and short-comings of its own.

It would pay to try each one out to see if it answers your transportation needs.—By A. E. Fleming.

▪ Driving the Big Three's "little three" is an experience that would interest any driver. And, if each car is driven under the same conditions, a lot can be learned about these cars.

Chrysler Corp. staged this experiment at its Engineering Proving Grounds at Chelsea, Mich. Cars used for the tests were the lowest-priced, four-door sedan models of Ford's Falcon, Plymouth's Valiant, and Chevrolet's Corvair. All were equipped with manual transmissions.

Not the Same—It is apparent after driving each of the cars that the producers set out to achieve different goals. In doing so, they naturally turned out very different automobiles.

The Valiant is 3 to 4 in. longer than the others. It is 250 to 350 lb heavier and its engine has 11 to 19 more horsepower. It is closer to a typically American family auto than Corvair or Falcon. Its performance and handling are closer to the standard, six-cylinder engine models of Chevy, Plymouth, and Ford.

Matter of Tastes — Corvair smacks of foreign influences. There is the 80 hp rear-mounted engine for one thing. The aim is to attract people with a taste for European flavors. In this respect, Corvair will compete more directly with the Volkswagens and Renaults than will the other two.

Falcon is a crossbreed. Most of its dimensions lie between the Corvair and Valiant. It is more of an all-around family car than the Chevy product, less than the Plymouth entry. Its economy may be best of the three.

Speedy but Rugged—All three cars have unitized body and frame construction. They were driven over extremely bumpy surfaces and rocky roads. All are rugged and structurally rigid. They'll stand up well in city or country.

Vehicles tested were raced accelerator-to-floor around a saucer-shaped track. Valiant's speedometer stopped moving at 97 mph, Corvair's at 85 mph, Falcon's at 80 mph. The Falcon was the roughest handling at these speeds. But at a normal highway cruising speed of 50 to 60 mph there wasn't much difference between the cars.

Long Reach—The little Ford's gearshift lever is on the steering column. Most people will find it easier to use than the floor-mounted stick-shifts of Corvair and Valiant.

Corvair's gearshift lever is farthest away from the driver's reach,

SLEEK LINES: Valiant offers sculptured styling, six-passenger comfort, and three body styles.

and it's a real stretch to second gear. The middle-man in a trio of front seat occupants will be very uncomfortable.

Long Legs—All three cars have ample leg room in front—enough for six-footers plus. Corvair's floor is flat, a nice feature. There's no transmission tunnel bulge because of the rear engine drive.

But the small Chevrolet's back seat area isn't designed for adults. Even a person of average height is cramped. A long trip probably wouldn't be enjoyed by a rear seat passenger other than a child.

Inside Dope—The interior appointments of the cars are about equal, with Falcon and Valiant getting a slight nod over Corvair. Falcon's cushioning seems superior, and driver visibility is better, too—perhaps because it is the highest of the cars.

There's a 15 pct grade at the Chrysler proving grounds, and it's quite a hill. All three cars started up the hill at 20 mph in third gear. Valiant and Corvair gained speed slowly and reached the top without a sputter. Falcon conked out about two-thirds of the way up.

Economy Stressed — The lesser performance of the Falcon may indicate that Ford engineers deliberately sacrificed some power for fuel economy. Ford claims its small car will cover more miles per gallon of gasoline than the others.

Ford also has a price advantage. The four-door sedan tested carries a suggested list price of $1803. The comparable Corvair model lists for $1860. Valiant's price will be announced just before the Oct. 29 introduction date.

Valiants will be hard to buy for quite some time. So far, only about 3000 units have been built. This doesn't provide a very large sampling for dealers. In contrast, about 25,000 Falcons and 50,000 Corvairs have left the assembly lines.

But before buying one of the small cars it would be worth the effort to check each one out yourself, including the two makes already established in the field—American Motors' Rambler, and Studebaker's Lark. A small car may —or may not—be what you want.

Auto Washes Are Cleaning Up

Automatic car washing is big business in the U. S.

One million Americans are spending $1.5 million a day to keep their autos clean and sparkling.

Today it takes at least $100,000 to start a topnotch automatic car wash establishment. Some operators have as much as $400,000 wrapped up in land, buildings and equipment.

More than 750,000 cars a month are washed by operators in Los Angeles, which leads the nation in car wash businesses. Next are Detroit, Chicago, New York, Cleveland and St. Louis. Cleveland, alone, reports a combined gross income of $250,000 a month for about 30 car wash units.

Cleaning Problems—But the car wash people have problems, too. One involves engineering changes in new cars. Last year it cost $1.5 million to make guide rail changes to accommodate the 1959 wide-track Pontiac.

Another problem centers on anodized aluminum. Strong alkaline cleaners, effective in removing road grime, etc., leave a light gray mottled effect on anodized aluminum trim parts. Auto companies and aluminum producers are trying to check this problem.

Washing Saves Money—But car wash people can still point out that washing and waxing can add 8 to 10 pct to the trade-in value of an automobile.

The general service manager for one auto company endorses frequent car washing—especially in winter. He says cars lug as much as 750 lb of extra weight in winter in accumulated snow and ice. While the added weight reduces gas mileage, natural chemical in the salt and ice damage exterior finishes and under parts of the car.

The Bull of the Woods

NO, I AIN'T GOT IT DONE! I'VE TOLD YOU TWENTY TIMES THAT I'LL FIX THAT WHEN I GET TIME-- I HAFTA DO THAT STUFF DURIN' TH' LUNCH HOUR WIT' ONE HAND WHILE I EAT WIT' TH' OTHER!
OH, THAT'S ALL RIGHT, DICK--TAKE YOUR TIME, TAKE ANOTHER YEAR --TWO! DON'T THINK I'M TRYIN' TO HURRY YOU!
A GUY MUST BE AWFUL TIGHT WHO'LL TAKE ALL THAT JUST TO GET HIS ELECTRIC TOASTER FIXED FER NOTHIN'!
BUT YOU HAVE NO IDEE HOW MUCH YOU SAVE --HE'S FIXIN' ALL OUR ELECTRIC APPLIANCES AN' MY WIFE CAN'T USE 'EM FER MONTHS AN' MONTHS--BOY, WHAT WE SAVE ON LIGHT BILLS!
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New CINCINNATI *210-6, the "Handy Andy" of the Centuramic line. Cost-reducing extra equipment: Vari-Pitch Infeed Attachment, micrometer handwheel, profile regulating wheel truing.*

Centuramic THE NEW LINE OF CINCINNATI CENTERLESS GRINDING MACHINES

Operation and setup of the new 210-6 Centuramic are convenient from both front and rear. (Rear controls extra)

THE MOST PROMINENT NAME in centerless grinding is Cincinnati, and the newest name in CINCINNATI FILMATIC Centerless Grinders is Centuramic. Over 35 years ago, Cincinnati pioneered the low-cost centerless method, building machines and devising equipment for precision grinding every conceivable type of part, from tiny dental drills to 18-foot steel bars . . . and other shapes and materials such as bowling balls, surgical sutures, reinforced glass fishing rods, rubber grommets. Cincinnati brought the cost advantages of precision centerless grinding to shops in every type of industry.

Now Cincinnati introduces the Centuramic line of five new Centerless Grinders. These new machines produce higher quality work than ever before, and at such low cost that they become doubly attractive for replacement or expansion programs. Centuramic Centerless Grinders are *cleaner and more convenient* to operate, *quicker* to set up.

Complete information on the 210-6, the versatile job shop member of the line, is outlined in a new catalog, No. G-728. A copy will be sent on request. **Grinding Machine Division, The Cincinnati Milling Machine Co., Cincinnati 9, Ohio.**

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CINCINNATI GRINDING MACHINE DIVISION

More Use of Arbitration Coming

Fact-finding boards will be called into use more often in nationwide strikes.

Government officials believe they serve to speed settlement, despite the steel strike outcome. —By G. H. Baker.

▪ Fact-finding boards in wage disputes are to be called into play more often in future nationwide strikes. Despite the recent inability of steel companies and the steel union to reach agreement via a Washington fact-finding board, federal officials now believe such boards should be tried more often in the future.

As tools for bringing disputing parties together, Eisenhower Administration officials now believe such boards stand a better-than-average chance of inducing settlement. At the same time, it is believed that the boards can do no harm to labor and management positions as the boards lack power to arbitrate or to impose terms of strike settlement.

"Honest Airing"—Labor Secretary James P. Mitchell believes firmly in the value of fact-finding boards. Despite the failure of the steel board of inquiry to restore labor-management peace, the opposing parties were at least able finally to define the issues that separated them, and to let the public know the questions that kept the two sides apart. In the opinion of some top Administration officials, "an honest airing of views cannot hurt anybody, and may well pave the way to settlement."

Labor-management disputes can no longer be permitted to become national emergencies, Mr. Mitchell believes.

But the Eisenhower Administration, unlike previous national administrations, is opposed to arbitration as a tool for ending strikes.

Mr. Mitchell proposes that Congress write into law the authority for the federal government to create fact-finding boards "as a regular part of the mediation process." Purpose: To clear the air for the disputing parties to move toward a solution.

Limited Power—Such a board, under the Mitchell plan, would be empowered only to hold public hearings and to subpena witnesses. It would not have the power to make recommendations, unless both parties should so request.

Who Will Shoulder Road Issue?

▪ Interstate highway financing worries may steer the White House and the Congress into a new wrangle in 1960.

Shaping up is a possible recommendation to President Eisenhower that he ask for a change in the plan for paying for the superhighways. The federal government now puts up 90 pct of construction money, leaving the states to pay for 10 pct of this 41,000-mile program.

Under Consideration — It would require a change in the highway law to alter this arrangement. A group of White House advisers, with Presidential Assistant John S. Bragdon as chief, is considering now whether to suggest that the President propose this move to Congress.

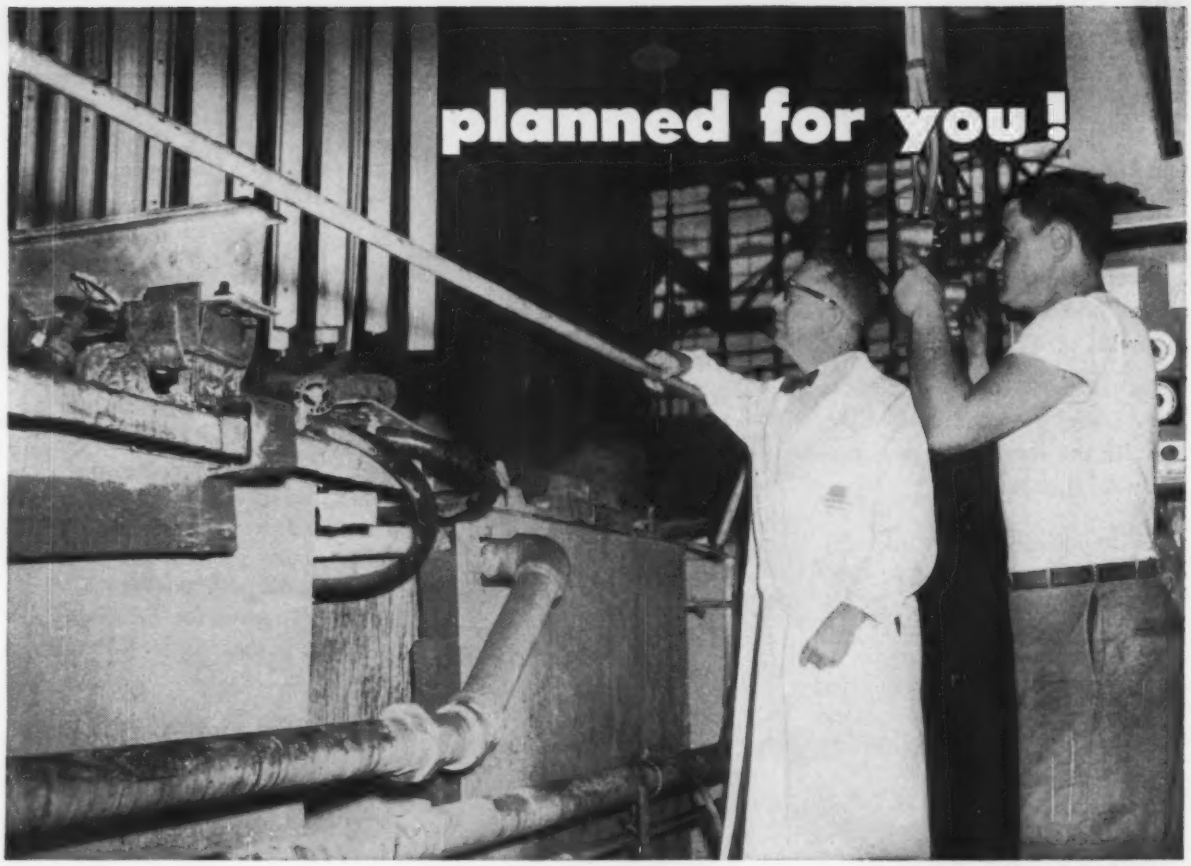
The group has run head-on into this problem: Federal contributions to the roadbuilding program, based on expected tax revenues, are going to be short of the amount needed to complete the interstate net by 1972, the date prescribed by Congress.

Two Turns—There are a couple of choices open to the government, aside from seeking higher federal road taxes, in meeting this problem. One is to keep the program on a pay-as-you-go basis by extending it for a number of years after 1972. The other is to transfer to the states a larger share of the building costs.

This second choice is more attractive to the Bragdon group. If the program were stretched out for six or eight years, U. S. economic and defense activities presumably would suffer. The alternative: Call on the states to pay perhaps 20 or 30 pct of the construction bill.

States Complaining — But while this financing plan may look good in White House circles, it would stir up a ruckus elsewhere. State governments are complaining now that they have all they can do to meet current highway costs.

Congressional delegations, with the voters' views in mind, could make it impossible for the present financing load to be shifted. The Bragdon group is well aware of the Capitol Hill opposition which may develop if the Administration attempts to force a highway-law change. Therefore, the group probably will go slow in drafting its recommendations on finding new funds for interstate roads.



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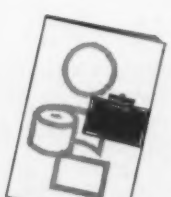

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Jets Will Fly 2000 mph by '70

Builders Are Planning Supersonic Passenger Planes

Future jetliners will look like present aircraft from the outside.

But they'll be windowless and offer ground-level comfort 15 miles up.—By R. R. Kay.

▪ How do you think you'll feel flying 2000 mph and 15 miles above the earth?

Well, the experts say it'll be an easy ride. The cabin will be at sea level pressure all the time. So when you travel in the supersonic jetliner, in a sense, you'll never leave the ground.

Picture Windows — You won't have windows. But you'll be able to see in all directions for the first time. How? By television. Imagine looking over the pilot's shoulder as he comes in for a landing.

R. C. Sebold, vice-president-engineering, Convair, says we'll have this kind of scheduled supersonic air service sometime around 1970.

Fast, Fast, Fast—The 2000 mph plane will look quite conventional, something like Convair's B-58 bomber. But it will be half again as fast—three times the speed of sound.

The jetliner of the 1970's may have seats that pivot like a rocking chair. That's for passenger comfort during steep takeoff and descent angles.

Electronic Tranquilizers Next?—Electronic airborne computers will monitor the performance of the plane's vital systems. It'll be an electronic worrier.

Lockheed Senior Vice-President Hall Hibbard says a 5000-mph-transport will pay off one day. But he agrees that the next step is the 2000-mph plane. He predicts that it could be operational by 1965—five short years away.

Military aircraft production is slowly grinding to a halt. The big five on the Coast, Boeing, Convair, Douglas, Lockheed, and North American are worried. They're making many studies and giving a lot of serious thought to developing a supersonic commercial transport.

Jets for the Boss

Are you doing business around the world? Within a year, there'll be an executive jet transport.

Lockheed says that its Jetstar will be ready by next July. The plane will cruise at 550 mph. And it will match the flight times of airline jets.

Imports Grow

Strike or peace in the steel industry. It doesn't seem to make much difference. Foreign steel keeps coming into West Coast ports.

Steel importers say it's only a drop in the bucket of overall consumption. But steelmakers serving the Farwestern market are concerned. Year after year, imports keep rising at a terrific rate.

No Apple Needed for This Teacher

CLASS IN SESSION: Technician in an industrial plant is shown at the Tutour, an automated "teaching machine" developed by Western Design Division of U. S. Industries, Inc., to speed learning process.

Carl:
This sounds like what we've been looking for. Suggest you investigate.
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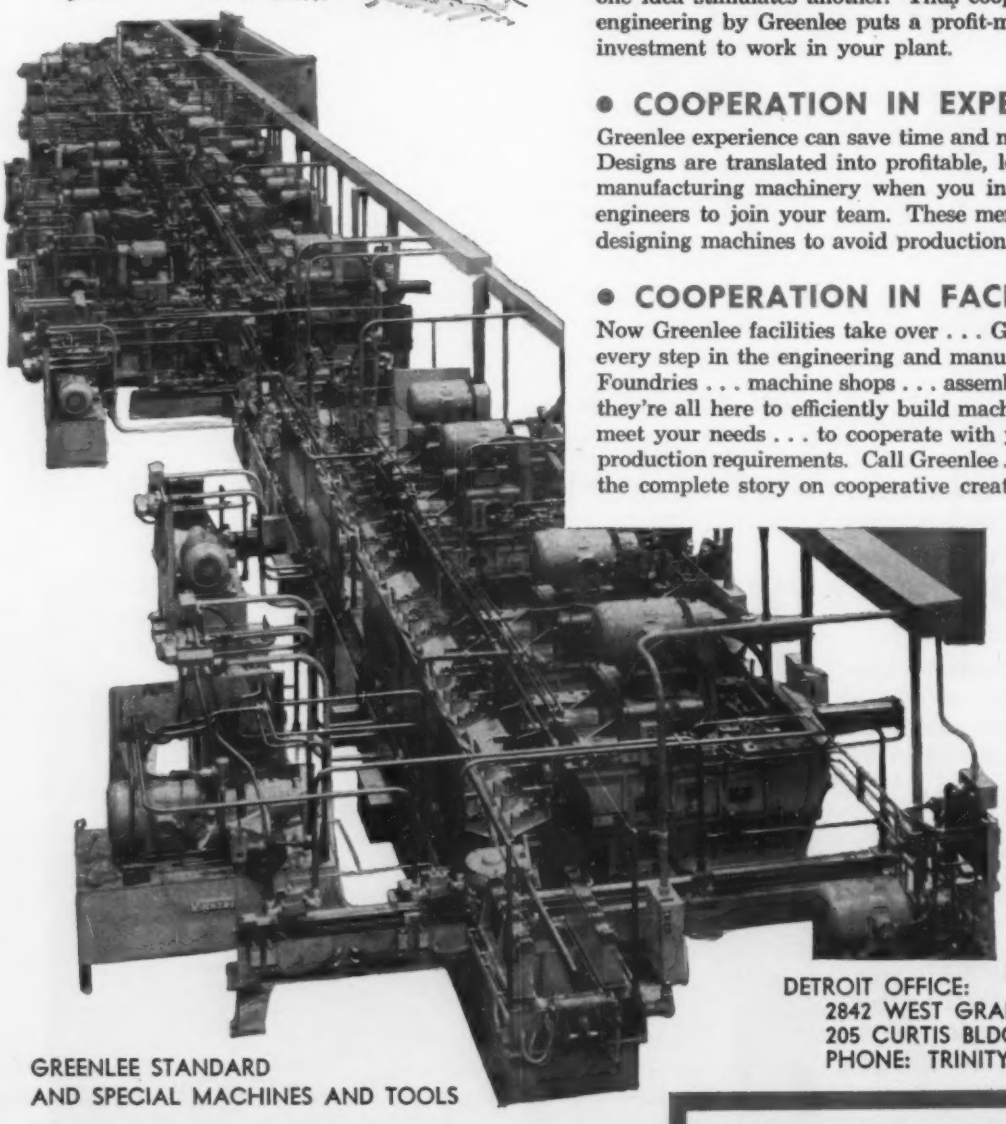

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Joe: These people have a lot of machines in the Detroit area — look them over and let me know your reaction. C.F.

New, Better Controls Coming

They Can Be Applied to Present Machines

Builder says new electronic control system for centerless grinders permits grinding parts to a tolerance near machine's capability.

It gives sensitive position and rate control of infeed as fine as 25-millionths.—By R. H. Eshelman.

▪ As industry demands machine tools that are more accurate and automatic, look for an intensified search for better but lower-cost controls. That's the word coming from the machine tool conference of the American Institute of Electrical Engineers, held at Cleveland last week.

As for controls themselves: How good are static types? How do they compare in reliability and overall costs? Do they pay off in production? Such questions challenged the electrical engineers in several lively sessions.

Control for Grinders—Of special interest is an electronic control system described for centerless grinders. It's for use on present machines. Philip Ohringer, of Airborne Instruments Laboratory Division of Cutler-Hammer, reports that with it you can grind parts to a tolerance approaching the machine's capability.

The system gives sensitive position and rate control of infeed as fine as 25-millionths. Maintaining size so precisely should make it possible to reduce or eliminate selective assembly, part sorting, cut the percentage of scrap and boost machine efficiency.

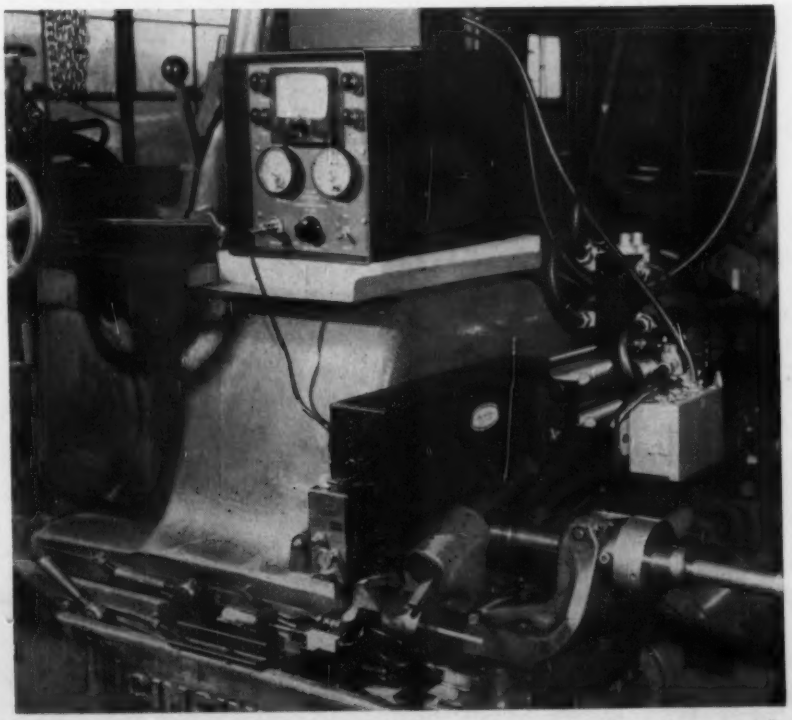
Two Elements — Basically the controls consist of two elements. One is the electronic gage and control unit with transducer head—the brain. Muscle is a Bellows hydraulic-pneumatic power feed.

The designer says: "The Bel-Air system is not a feedback system as far as automatically gaging parts and automatically correcting for size. It can, however, be considered a feedback system in the sense that the grinder slide position is monitored. And electrical signals feed back to the driving mechanism, at preselected points, to control its motion."

Comparative Proof—In comparative tests, the system showed final slide position variation less than 50-millionths in.; output part size scatter ran about 100-millionths. This is several times better than mechanical stop setups tested.

Interesting feature of this development is how design engineers made scientific use of statistical methods—machine scatter, temperature and wheel breakdown trends. After determining grinder feed characteristics they designed the electronic "brains" to overcome causes of variations.

Electronics Aid Precision Production



BRAIN & BRAWN: An electronic gage and control unit is the system's brain. A Bellows hydraulic-pneumatic power feed provides the muscle.

INDUSTRIAL BRIEFS

Team Play — Herbert W. Graham, formerly vice president, research, Jones & Laughlin Steel Corp., has formed a new research consulting organization under the name Technically Experienced Associates, Mobilized, or "TEAM, Inc." Offices are located at 99 Park Ave., New York. Members of the organization are retired research executives from industrial companies in the U. S.

Millions at Muncie—On Nov. 5, Westinghouse Electric Corp. will break ground for a giant new multi-million dollar transformer plant in Muncie, Ind. The plant will be part of the company's transformer div. It will add to the division's capacity for the manufacture of large power transformers with ratings above 50,000 kilovolt-amperes.

Dedication—The recently completed helium plant of the Bureau of Mines at Keyes, Okla., will be formally dedicated on Nov. 17. It has a designed capacity of about 290 million cubic-feet of helium a year.

Big Order — General Electric Co. has received a $7 million order to furnish complete electrical systems for two Ford Motor Co. metal rolling mills. Both mills are located at Ford's Rouge plant, Dearborn, Mich., which produces sheet metal for automobile bodies.

Another Opening — Acme Steel Co., Chicago, has opened a district sales office in the Chamber of Commerce Bldg., Indianapolis. It will handle commercial flat rolled products produced by Acme Steel in Chicago and Acme-Newport Steel Co. in Newport and Wilder, Ky.

Meeting Theme — "Materials—Key to Space Flights" will be the theme of a 2-day national meeting to be conducted in Cincinnati, Apr. 27-29, 1960, by the Cincinnati, Dayton and Columbus Chapters of the American Society for Metals.

Overseas—Union Carbide Corp. will build a customer service lab for plastics in Geneva, Switzerland. The lab will be under the supervision of Union Carbide Europa, S. A., an affiliate of Union Carbide Corp. in Geneva. It is expected to be completed early in 1961.

International — The Walworth Co., New York, has an exclusive licensing arrangement with Canada Iron Foundries, Ltd., Montreal, for the manufacture and sales in Canada of the Walworth industrial line of valves. These include: Bronze, iron, steel, plastic, and lubricated plug valves.

Warehouse Expansion—Norma-Hoffmann Bearings Corp., Stamford, Conn., will double its nationwide warehousing capacity for precision ball, roller and thrust bearings. They will establish four new warehouse buildings and expand seven present warehouses across the country.

Two Unit Charge — Irwin-Sensenich Co., Irwin, Pa., manufacturer of mine cars and transportation equipment, has been awarded a contract by Reynolds Metals Co., for a newly-developed charging machine. Consisting of two units, a transfer car and a charge rack, the unit will be installed at Reynolds' aluminum plant at Listerhill, Ala.

"I thought you might want something to read while you're resting."

Modernization — As part of a modernization program at the Campbell Works, Youngstown Sheet & Tube Co., the Sturtevant Div., Westinghouse Electric Corp., is supplying fans and filter equipment to force-ventilate twelve main-stand motors and two large motor-generator sets.

Acquisition — Howell Electric Motors Co., Howell, Mich., has acquired The Leland Electric Co., a former division of American Machine & Foundry for an undisclosed sum. Leland now gives Howell, three wholly-owned operating subsidiaries and four manufacturing plants.

Plant Purchase—National Acme Co., Cleveland machine tool builder, has bought Shalco Corp., manufacturers of shell molding equipment. Shalco is named for Stanford University Professor F. K. Shallenberger, who founded the company eight years ago.

New Purifiers — The V. D. Anderson Co., Cleveland, is introducing Type LCR Purifiers for cleaning air and steam in lines up to 2 in. in size. The new model provides its own liquid storage reservoir for keeping air and steam lines free of moisture and condensate.

On the Move—Johnston & Funk Metallurgical Corp., Wooster, O., moved its headquarters and plant to Huntsville, Ala. This coincides with a change in corporate relationship between J & F and Mallory-Sharon Metals Corp., Niles, O. Under the new arrangement, J & F is now owned by Mallory-Sharon and P. R. Mallory Co., Indianapolis.

Building Plans—Pittsburgh Coke & Chemical Co. plans to build a new 20-million-lbs per year maleic anhydride plant at the company's main Neville Island plant. The facility is scheduled to begin operation in 1961. Maleic anhydride is a chemical used in the plastics and resin industries.

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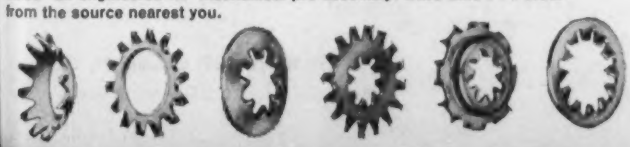

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Mallory-Sharon Metals Corp.—**A. R. Zender,** elected president; **E. J. Cronin, Jr.,** named vice president and general manager.

Smith Welding Equipment Corp.—**P. E. Taylor,** appointed vice president, sales.

U. S. Steel Corp.—**C. H. Kraft,** appointed asst. treasurer.

Herman Pneumatic Machine Co.—**A. R. Arrick,** elected secretary.

Jones & Laughlin Steel Corp., Stainless & Strip Div. — **D. P. Moore, Sr.,** appointed supervisor, quality control, Louisville, O., plant.

Allegheny Ludlum Steel Corp.—**R. B. Egan,** named production steel salesman, Philadelphia district sales office.

Union Wire Rope Corp.—**L. A. Davis,** promoted to manager, wire sales.

The New York Air Brake Co., Aurora Pump Div.—**R. D. Elder,** appointed division sales manager.

Consolidated Electrodynamics Corp., Datalab Div.—**Dr. J. G. Frayne,** appointed manager, development engineering.

Pittsburgh Metallurgical Co., Inc.—**H. A. Roemer, Jr.,** appointed manager, sales.

Buffalo-Eclipse Corp., Prophetstown Manufacturing Div.—**G. B. Thurstone,** appointed general manager.

Raybestos-Manhattan, Inc., Manhattan Rubber Div.—**W. E. Perkins,** appointed factory manager.

F. M. Goodwin, Jr., appointed vice president and asst. treasurer, U. S. Steel Corp.

Scully-Jones & Co., Special Products Div.—**H. W. Deutsch,** appointed manager.

Mahoning Valley Steel Co.—**A. J. Gizzi,** appointed general manager, sheet steel section.

The Stanley Works—**C. K. Richter,** appointed export manager, New Britain, Conn.

H. K. Porter Co., Inc., Vulcan-Kidd Steel Div.—**J. N. Guest,** appointed manager, Production, Kidd Works, Aliquippa, Pa.

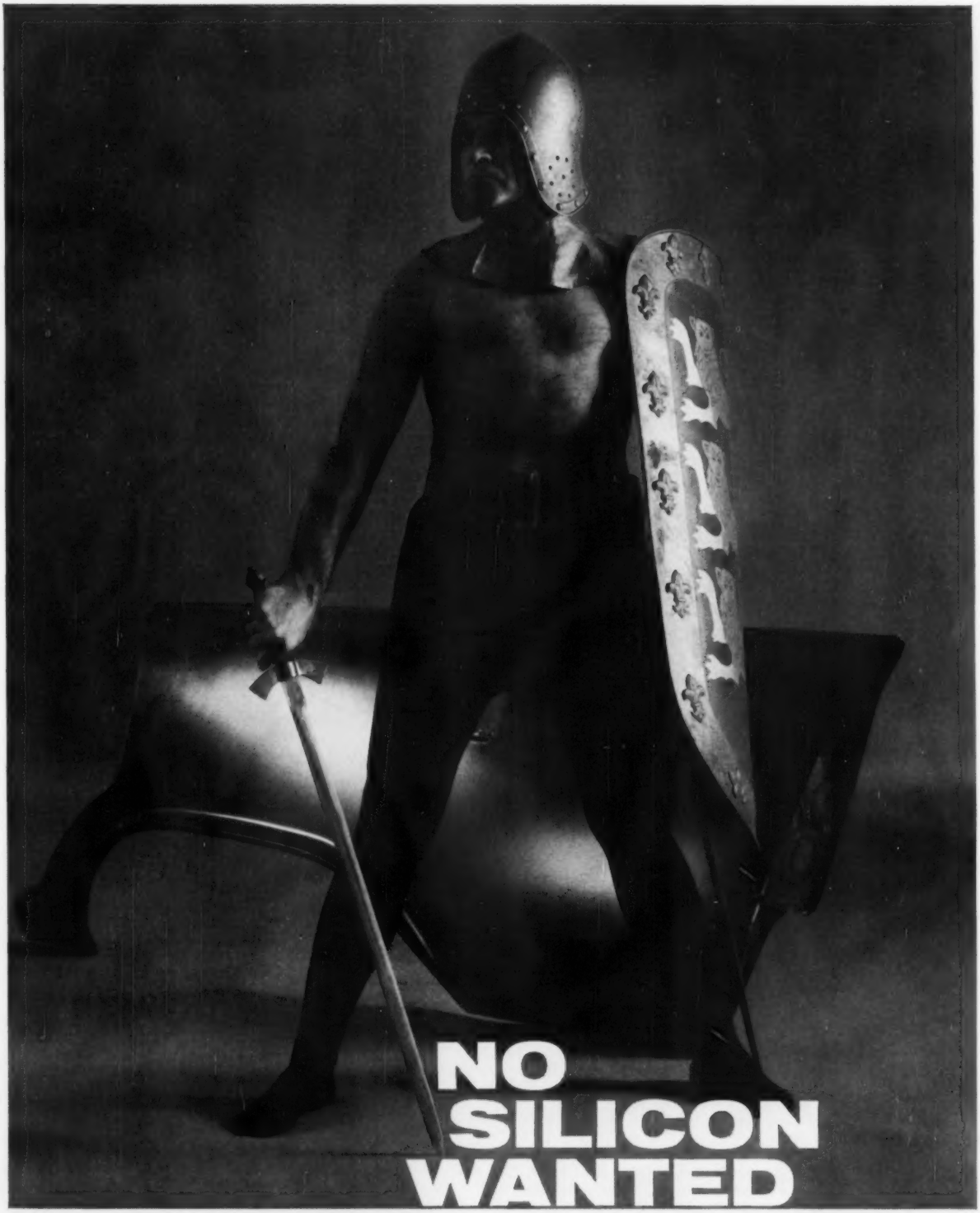
The Clark Equipment Co., Industrial Truck Div.—**D. S. Hansen,** named Pittsburgh district sales man-

(Continued on P. 111)

K. D. Cassidy, named vice president, industrial relations, Ford Motor Co.

M. L. Denise, named vice president, labor relations, Ford Motor Co.

L. A. Amos, appointed manager, operations, Kaiser Aluminum International.



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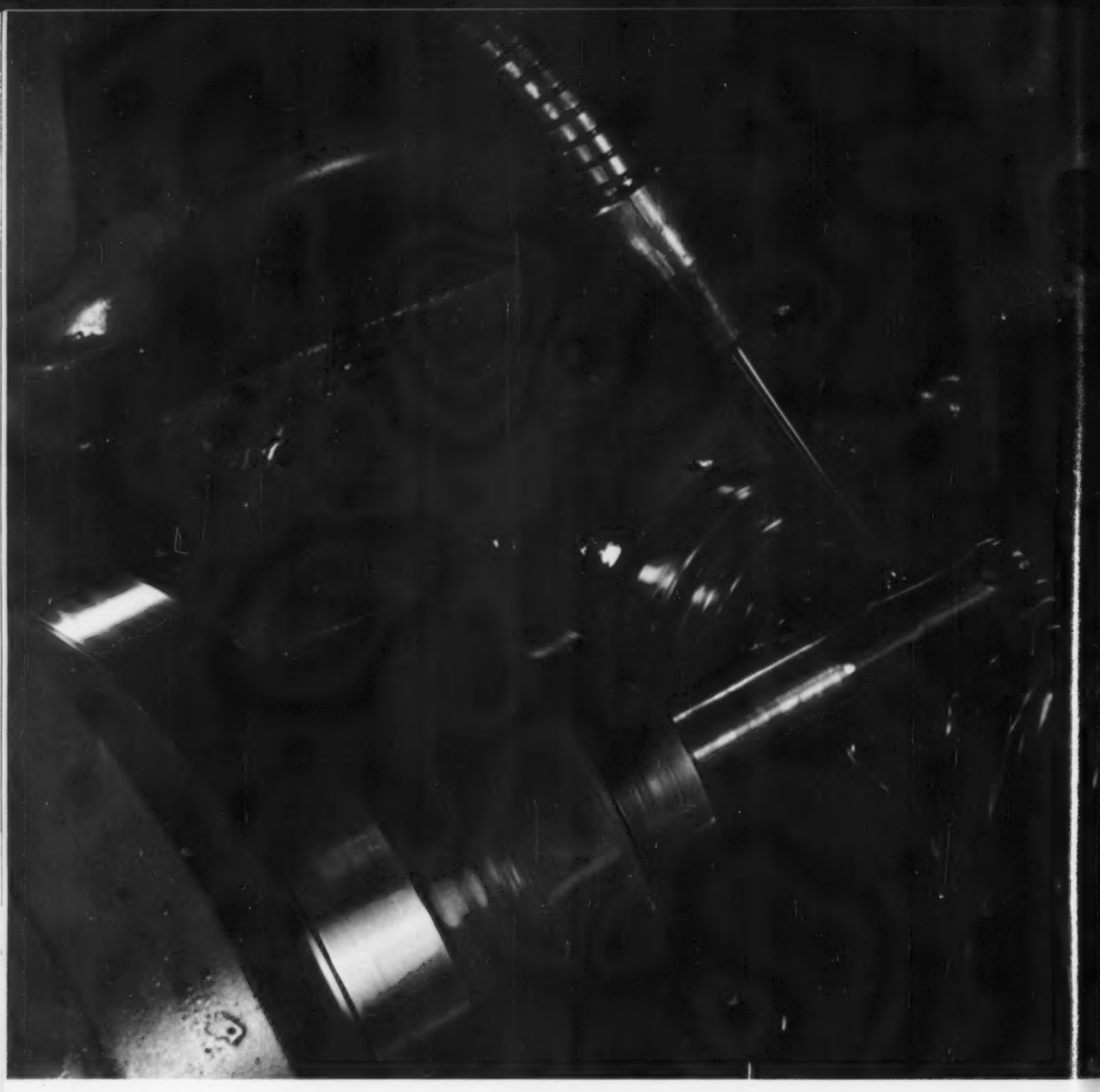

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"Until recently, we were using a soluble oil in the hobbing of flutes on the rifle bars for our Cleveland Le Roi drills. Then, when we installed a new gear hobber, we switched to Gulfcut 21C, a sulfurized mineral cutting oil. Since then, using the same type of hob as before, we have doubled hob life on this job and now machine twice as many rifle bars between grinds."

That's the word from Gordon Moffat, Factory Superintendent at the Cleveland Rock Drill Plant of Westinghouse Air Brake Company's Le Roi Division. This plant produces many varieties and sizes of 3 basic types of drill—the hand sinker, stoper and air leg.

"With the previous cutting oil," reports Mr. Moffat, "we were getting only 7 finished spline shafts from each hob shift, between grinds. Feed and speed were .0135 ipr and 154 rpm respectively. With Gulfcut 21C, our feed is now .018 ipr with a speed of 200 rpm. We now turn out 12-14 pieces between grinds, double our previous production. With hobs at $100 each, this amounts to quite a saving in tool costs.

"We're also getting better finishes with the help of Gulfcut 21C, and we find it much easier to stay within our specified tolerances."

Why does Cleveland Rock Drill get such good results with Gulfcut 21C? Because it provides greater sulfur activity over a wide range of machining operations.

The "rock room" where Cleveland Le Roi drills are given rugged tests before shipment. At left, Gordon Moffat, Factory Superintendent at Cleveland Rock Drill Plant. Right, T. F. Irving, Gulf Sales Representative.

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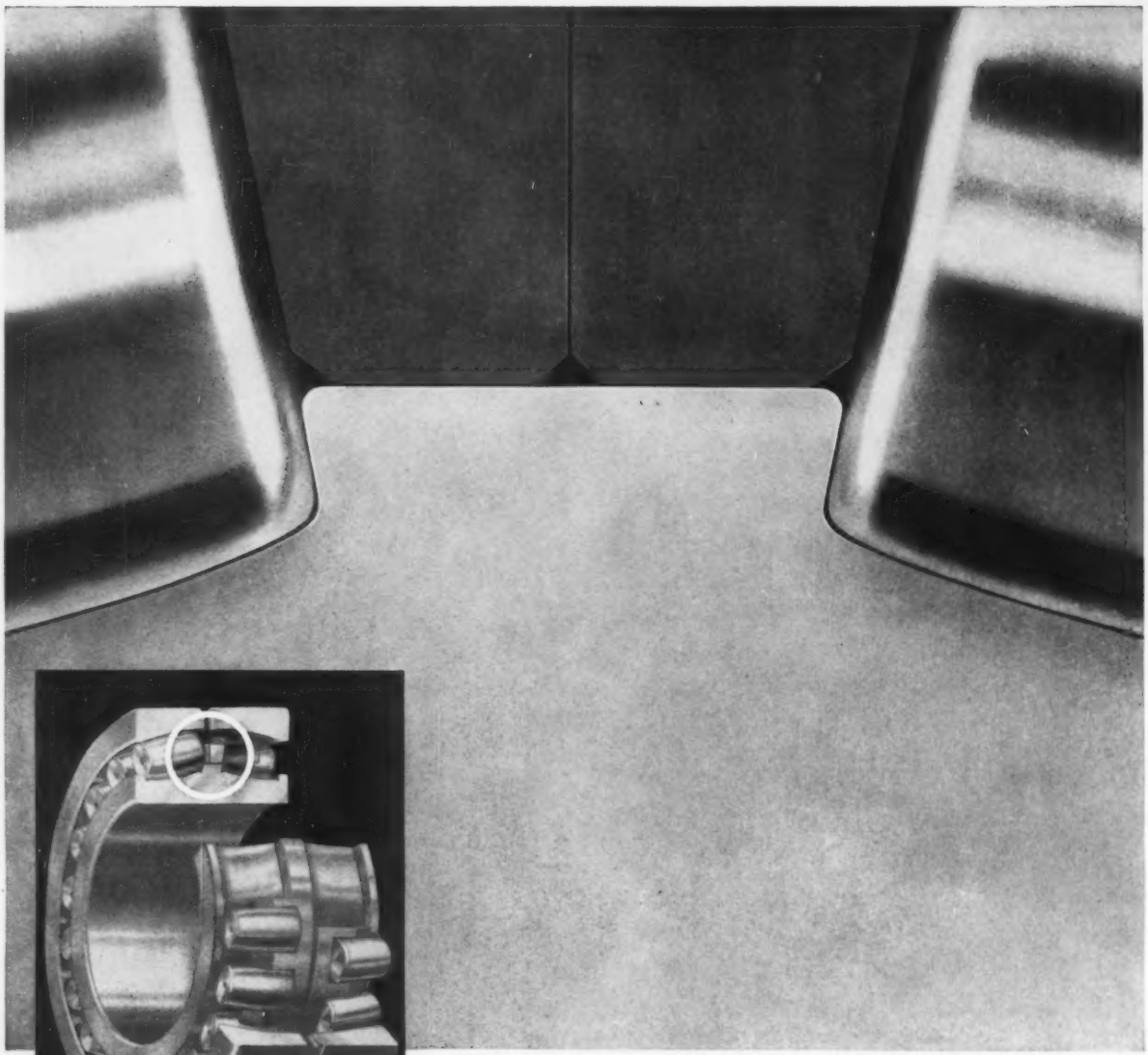

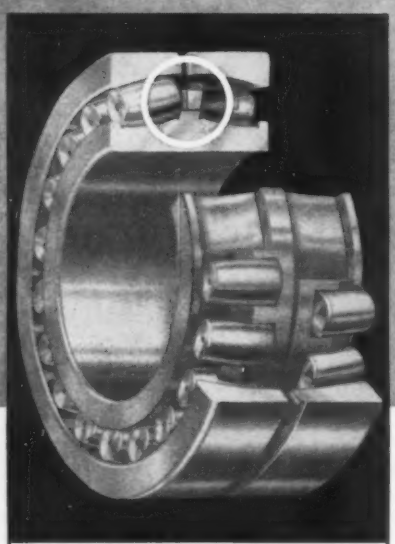

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(Continued from P. 106)

ager; **J. D. Goodson,** named St. Louis district sales manager.

The Electric Autolite Co., Replacement Sales Div.—**W. F. Connolly,** named general sales manager.

W. S. Fitz, Jr., appointed market analyst, Kennametal Inc., Latrobe, Pa.

General Electric Co. — **R. J. Keates,** appointed manager, manufacturing engineering, phenolic products section, Chemical Materials Dept., Pittsfield, Mass.

R. A. Davies, named staff asst. to the controller, Armco Div., Armco Steel Corp., Middletown, O.

Hewitt-Robins, Inc.—**J. L. Shortley,** appointed manager, Patent Dept.

The Budd Co.—**B. L. Mack,** promoted to sales manager, electronic controls section.

The Electric Products Co. — **R. D. Guentzler,** appointed purchasing agent.

Vickers Inc., Mobile Hydraulics Div.—**H. H. Carlson,** appointed Detroit district manager.

R. B. Steinmetz, elected president, Anaconda Wire & Cable Co., subsidiary of The Anaconda Co.

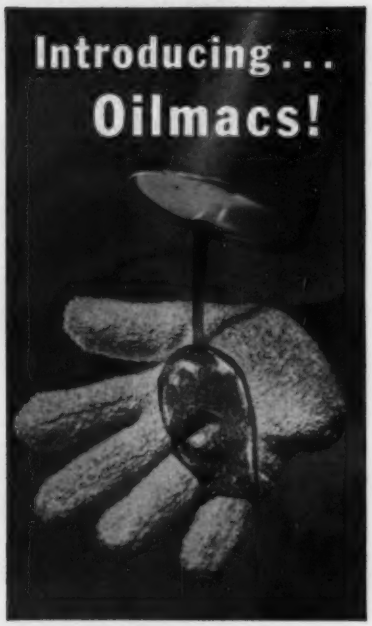
U. S. Steel Corp.—**J. L. Craddock,** appointed district supervisor, Cleveland audit district; **H. C. Mueller,** appointed district supervisor, Chicago audit district.

R. T. Hood, appointed president and general manager, Gabriel Div., The Gabriel Co., Cleveland.

Vickers Inc.—**R. C. Lewis,** promoted to district sales manager, mobile products, New York-Worcester-Philadelphia area.

The American Brass Co.—**J. L.**

(Continued on P. 114)



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for less maintenance, less downtime, added profit. New excitation and power conversion systems have no rotating parts. Sealed silicon rectifiers and saturable reactors need no warm-up, virtually eliminate power unit maintenance.

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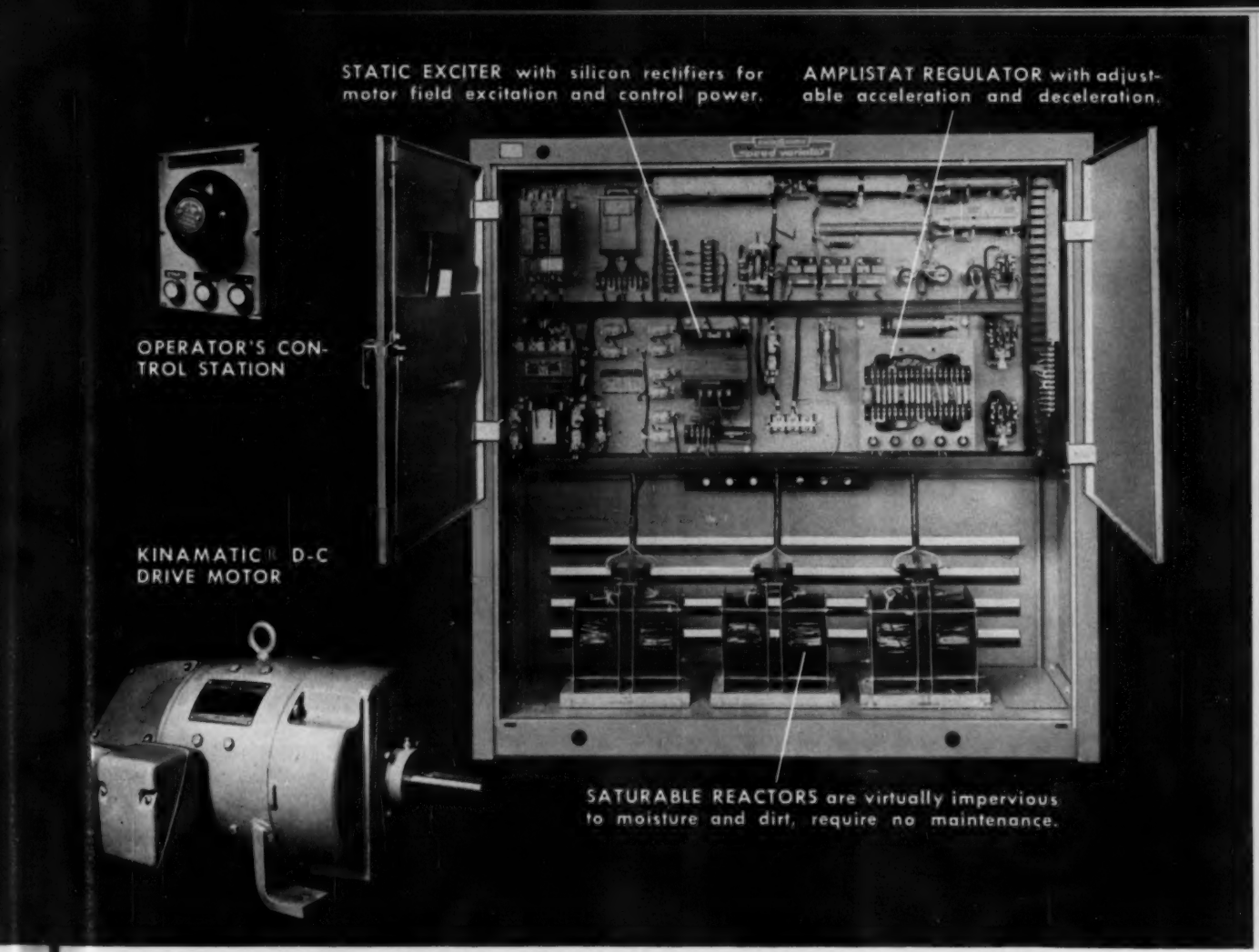
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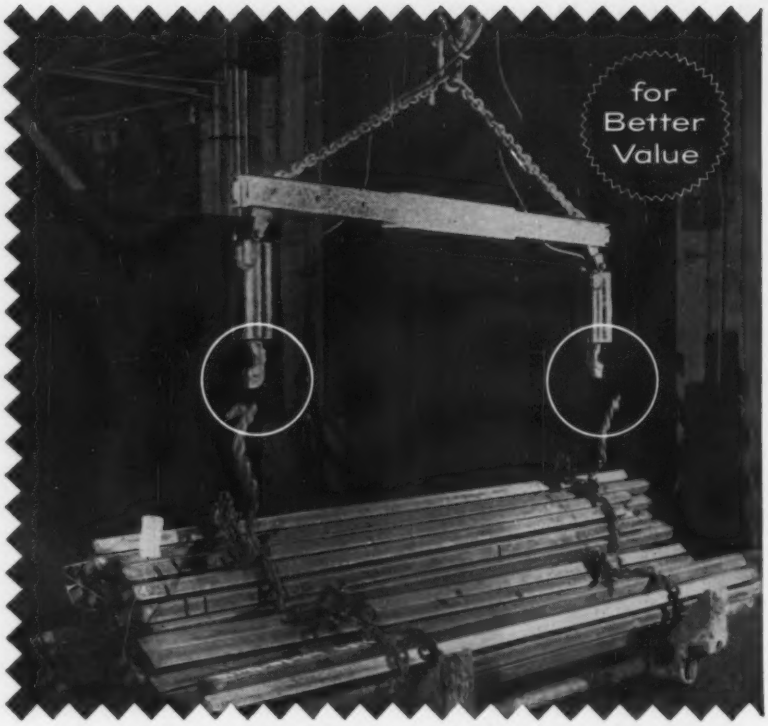
GENERAL ELECTRIC



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HE'S AT SAFE DISTANCE RELEASING THIS LOAD BY PUSH BUTTON CONTROL!

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*Indicates Warehouse Stocks

ACCO

(Continued from P. 111)

Marvin, appointed asst. sales manager, Kenosha (Wis.) Div.; **C. C. Corzatt,** named Chicago district sales manager.

Joseph Molnar, appointed chief industrial engineer, methods, U. S. Steel Corp.

C. C. Womack, named chief industrial engineer, wage and salary evaluation, U. S. Steel Corp.

The Heald Machine Co.—**G. H. Lockwood,** appointed manager, development and research.

Eastern Rolling Mills, Inc.—**J. M. Brion,** appointed general sales manager.

OBITUARIES

J. F. Donahue, 80, former senior vice president and board member, Lamson & Sessions Co.

T. W. Dodd, 82, founder and president, St. Joseph Structural Steel Co., St. Joseph, Mo.

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TEF-SEAL NUT

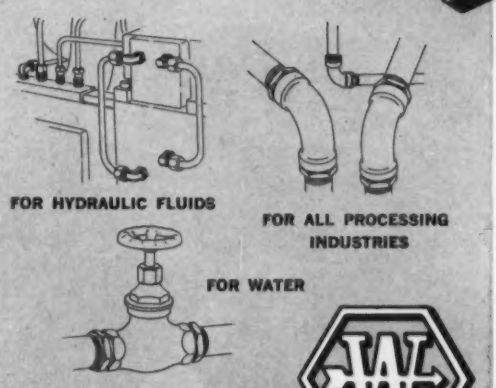
makes every pipe connection

LEAKPROOF!

***SAVE** - expensive maintenance costs*

***SAVE** - labor and downtime*

***SAVE** - valuable fluids*



Eliminates leaks on all pipe threads—Dry Seal or standard. No pipe compound required. Quick, easy installations in cramped quarters where wrench clearance is limited.

Tef-Seal Nuts are an economical substitute for straight thread "O" ring boss fittings using original female pipe ports. Tef-Seal gives you positive seal on directional fittings like tees and elbows without distorting mounting bosses or damaging expensive valves and pumps.

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SPECIFICATIONS

Pressure Rated at 3,000 p.s.i. working pressure
Proof Tested: 15,000 p.s.i. in sizes up to 1¼"
10,000 p.s.i. in sizes 1½" and up
Each fitting is marked with its individual rating
All threads are American Standard Taper Pipe Threads — Dryseal (N.P.T.F.)

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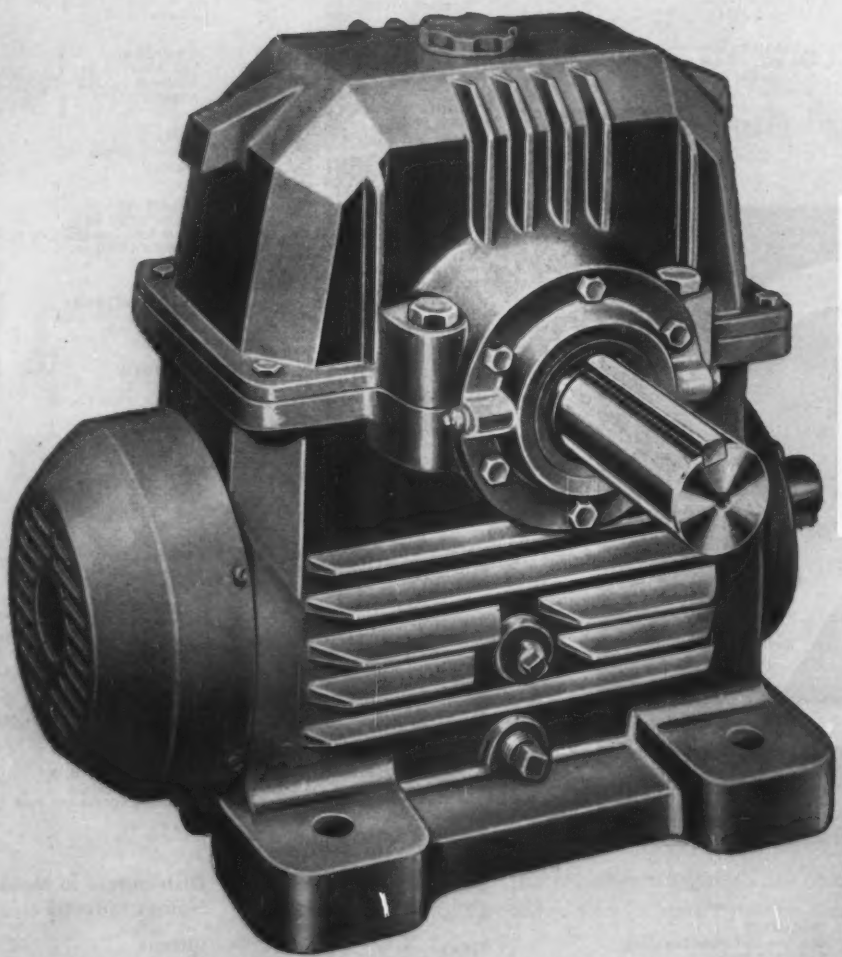

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DL 479

Miniaturization Broadens Field For Electro-Hydraulics

By G. W. Lewis—Manager, Mechanical Engineering Research, The Electric Autolite Co., Toledo

How to pack more control equipment in less space? That's one of today's most pressing questions.

Here's how electric actuation joins with hydraulics to open new areas to miniaturization.

▪ Size in the space age is hypercritical. The truth is we're running out of engineering room, not only inside missiles, rockets, aircraft, but also in production areas: process controls, machine tools—even in automotive design.

With the resultant need to miniaturize, designers face new engineering problems. We can no longer follow traditional paths.

In the miniature world of today and the sub-miniature world of tomorrow we've got to look for new concepts and techniques. We may even need a whole new set of rules or design principles to achieve success.

Precision Start — Here at Autolite, a background of experience in mass production of small, high precision devices piled up during the war. These applications covered a range of military equipment.

Since the war interest in miniature hydraulics was first directed to automotive uses. But we already see a far broader field.

One of the things developed is a complete central system of hydraulic power accessories. These include brake booster, powered steering, window lifts, hydraulic conduits and connectors, seat shifters, rear trunk lid actuator, pushbutton transmission control, electro-hydraulic control valves, tank-mounted fuel pump and windshield wiper motor.

Simplifies Design—This miniature system licks the space problem posed by the topsy growth of hybrid accessories. A single compact engine-driven pump furnishes the hydraulic power through an accumulator.

It's a way to simplify many systems found in automotive designs.

Typical vehicles have accessories powered by engine-driven hydraulics, electric-driven hydraulics, direct electric drives, direct vacuum systems and electric-driven vacuum.

We've given a test vehicle continued driving under normal service conditions over a five-year

TAKES RESEARCH: Studying systems design problem, Autolite Research Director G. Spaulding (left) and author look over components.

period. The miniaturized central hydraulic system has been completely successful.

Ground Rules—Development of this system required solution of many design problems. Also a set of ground rules evolved as experience was gained.

One of the first things learned is that you've got to find the right hydraulic fluid. Because of the small quantity of hydraulic fluid needed in high-pressure miniature systems, the orifices and conduits are small too.

Your extreme fluid temperatures in a mobile system can range from 250°F to —40°F. So low viscosity and a high viscosity index are required.

Find Compromise—We find that an aviation hydraulic oil with a pour point depressant is a fair compromise to these requirements.

Cleanliness is a must in any hydraulic system. But it's even more vital in a miniature system. No matter how clean the system at first, it becomes contaminated in operation.

Origin of some types of dirt is a mystery. The answer is continuous, full-flow filtration. You need a 10 to 20 micron unit with a bypass arrangement that prevents feeding of dirt back into the system.

More Than Scaling Down—Miniaturization means more than simply scaling down units. For example, leakage—always a problem in hydraulics—could be fatal in a miniature system.

To avert this danger we avoid pipe threads and flared fittings. Instead we've developed a special flange connection system.

It's put together with a screw driver, seals with either standard "O" ring or square section ring. It holds high or low pressure even if screws are not tight. At a junction, branch lines can be brought together in a neat, space-saving manner.

New Fields—Branching out from this original development, we foresee applications in many fields for these and similar devices. There's a rapidly broadening field where small —even minute— quantities of power of highly controllable magnitude and direction are required. In this area are miniature, sub-miniature and even pulse hydraulics.

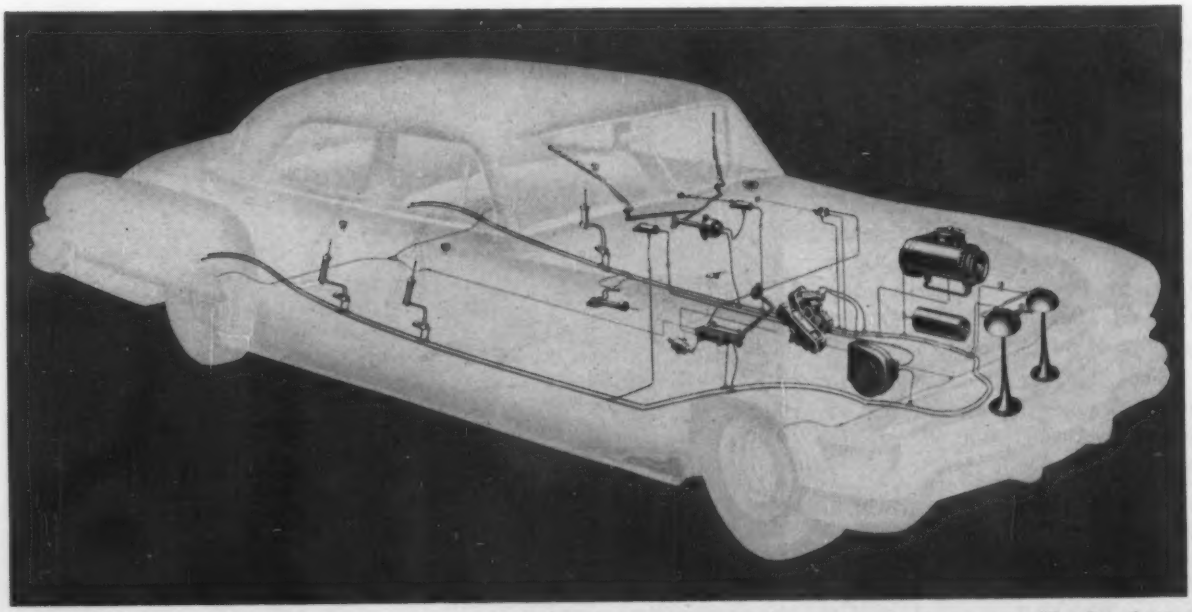
The marriage of hydraulics and electricity looks most promising. Miniaturized electro-hydraulics can effectively solve many problems in the rapid development of automation and muscle-augmenting mechanisms. But solutions need a fresh and non-traditional point of view.

Sub-miniature System—To study possibilities, we've designed and built an experimental system with tiny valves, pumps and other sub-miniature units. The system detects a very low energy initial motion electrically.

This electric signal is amplified in a tiny transistor amplifier. This in turn energizes a sub-miniature hydraulic system which causes a load to follow the initial motion. Energy amplification is several thousand times.

Rapid Response—The electro-hydraulic valves are very responsive. Time to open and close is about 0.006 seconds.

Although miniscule by present standards, valve flow capacity is 35 cu in. per minute. At 1500-psi hydraulic pressure, this is more than ⅛ hp.



MANY ADVANTAGES: Closed-center miniature hydraulics system will save space, weight, is simpler with less maintenance, lower cost; will give better performance than mixed power-actuation methods.

It's a beginning in electrical control of moderate hydraulic energies. Further efforts will make electro-hydraulic valves smaller and smaller, at the same time increasing their speed of response.

Future Developments—Relationship between electricity and hydraulics would become so close as to enter an area that might be termed fluid electronics. It's conceivable that electronic control of fluid flow will be accomplished without any moving mechanical elements.

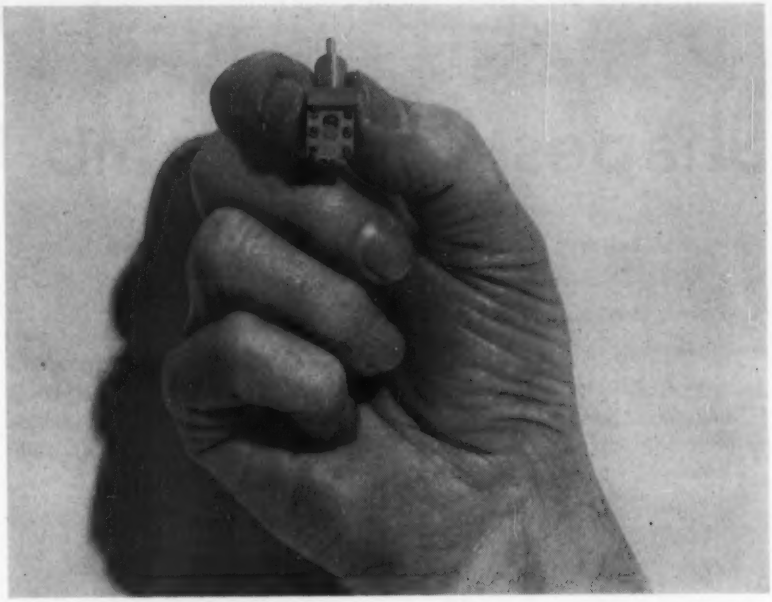
Some practical results of this development would be enormous amplifications of tiny energies and high-speed control of great precision. Properties of electronics and hydraulics so combined would have a profound impact on the field of controls, automatic computer systems, communications equipment and other technologies.

Only a Beginning—By analogy with the electrical fields we are standing at the threshold of this new development. Take the early development of electric power: arc-light, incandescent lamps, electric trolleys and motors for machinery. All this was in the direct current era.

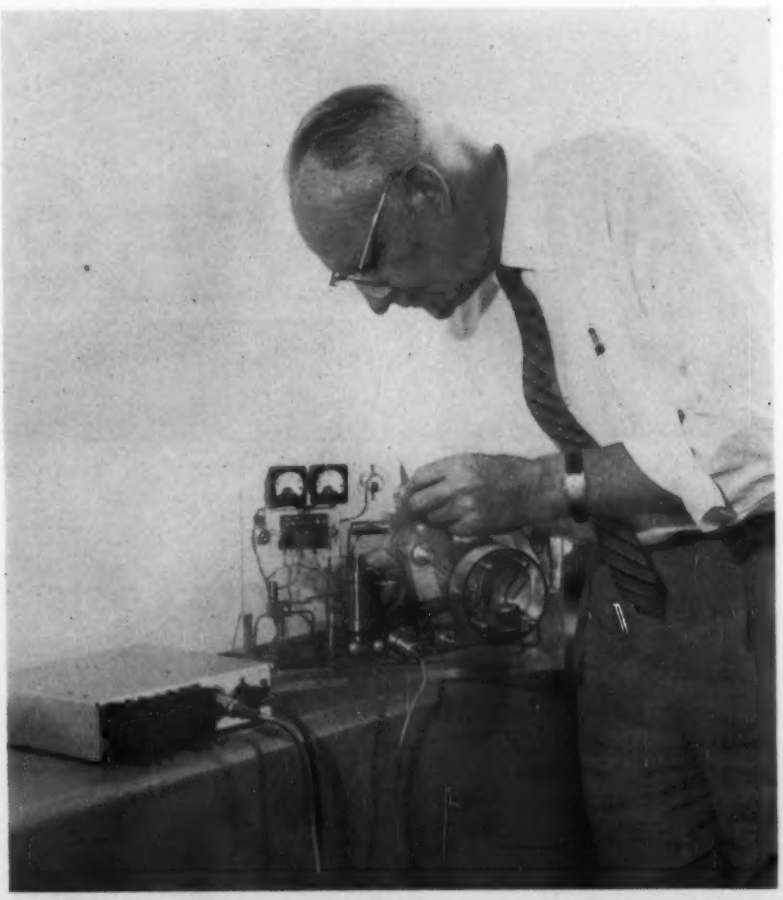
Then Nicola Tesla devoloped the foundations of the alternating current power system. Though it took time to catch on, it had a great potential which vastly outweighed practical disadvantages. As our need for electric power grew the potential of ac systems blossomed almost overnight.

There's a parallel with pulse hydraulics: a great unrealized, potential and some practical disadvantages. Similar objections will spring up against pulse hydraulics to those encountered by alternating current advocates. These will be overcome in time.

Reprints of this article are available as long as the supply lasts. Write Reader Service Dept., The IRON AGE, Chestnut & 56th Sts., Philadelphia 39, Pa.



SMALLER THAN SMALL: Tiny hydraulic pump developed for sub-miniature system will handle big jobs. It's one of many parts now under test.



BREADBOARD SYSTEM: Sub-miniature, transistor system uses electro-hydraulic servo units. Author completes a special-type connection. It's put together with a screwdriver and seals with "O" or square section ring.

Low-Cost Chemical Milling Shapes Honeycomb Cores

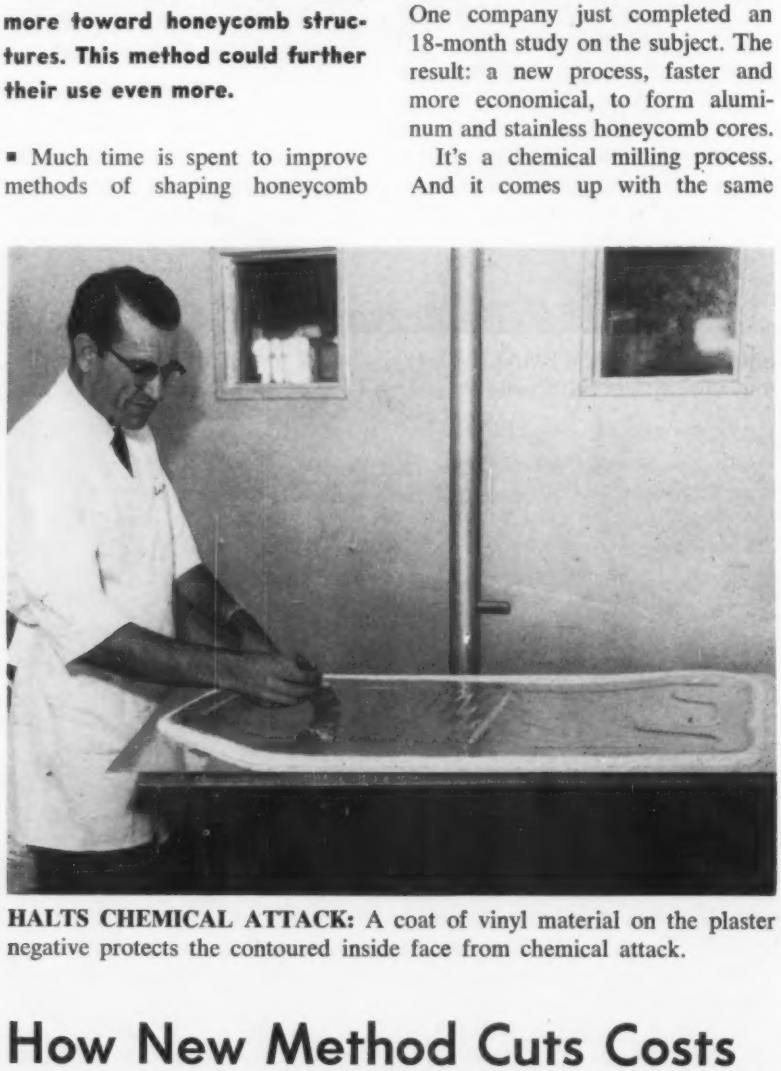
Aircraft builders are leaning more toward honeycomb structures. This method could further their use even more.

▪ Much time is spent to improve methods of shaping honeycomb structures in the aircraft industry. One company just completed an 18-month study on the subject. The result: a new process, faster and more economical, to form aluminum and stainless honeycomb cores.

It's a chemical milling process. And it comes up with the same physical properties obtained by current cutting or crushing techniques. This new method easily holds tolerances to 0.005 in.

In fact, with some extra precaution, even closer dimensions can be met. You can hold aluminum to 0.003 in. and stainless-steel parts to 0.002 in.

Called the Chem-Mill technique, it was developed by Norair, a division of Northrop Corp., Hawthorne, Calif. Northrop has since turned the process over to Turco Products, Inc., Wilmington, Calif., for further refinement and study of production procedures.



HALTS CHEMICAL ATTACK: A coat of vinyl material on the plaster negative protects the contoured inside face from chemical attack.

Tests on Aluminum — Northrop engineers ran a series of tests about a year ago to prove the economy of the method. They started with two ¾-in. thick sections of aluminum core, both of them 16 in. wide and 36 in. long.

Then they machined them to thickness ranges of 30 to 67 mils. Next they shaped the cores, one by Chem-Milling and the other by machining methods.

Great Savings—The table compares the costs of the two methods. The difference in production costs is much lower in chemical milling.

And the lower tooling cost with the new process is even more significant. The total tooling cost is 77 pct less in chemical milling—$800 compared to $3500 with the old setup.

Seven Steps—Chem-Milling consists of seven basic steps. First, an accurate master pattern must be made. This will include exact forms of the cutouts. Tooling resin is a good material for the pattern.

Next a negative is cast from the master pattern. This negative should be able to disperse in water. A brit-

How New Method Cuts Costs

PRODUCTION LOT	RELEASE QUALITY	UNIT COST, $		SAVING, PCT
		MACHINE & CRUSH PROCESS	CHEM-MILL PROCESS	
10	5	619	280	55
100	10	208	133	36
500	25	137	93	32
1000	50	120	83	31

tle, special mixture of plaster is used for the casting material.

Vinyl Mask—Since added protection is needed, they apply a vinyl-type mask to the contoured inside face of the negative. This is done by spraying, brushing, or flow coating.

This mask should be soft enough to allow the fragile face of the thin honeycomb core to cut into it. As the core is being processed, a press with parallel platens forces the core right through the vinyl mask and down into the plaster negative. Core rejection will result if the core itself distorts during pressing.

Hot Melt—Then a soft rubber-like material, resembling a hot melt, is poured into the back face of the exposed core. This fourth step helps protect the back face of the core from the corrosive action of the etching fluid which is used in a later step.

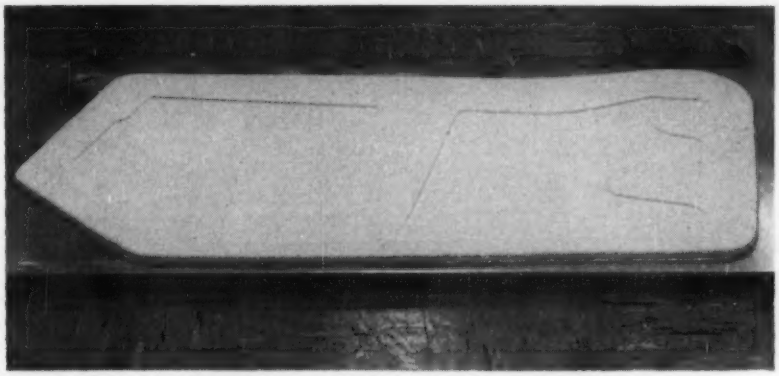
By removing the water-dispersable negative in a water rinse, the core is finally exposed. The contour to be followed is hidden down inside the core section.

Gets a Bath—In the next step the entire assembly is immersed in a Chem-Mill etch solution. Choice of solution depends on the material being processed. The corrosive action of the etching fluid attacks the exposed core, serving to remove it slowly.

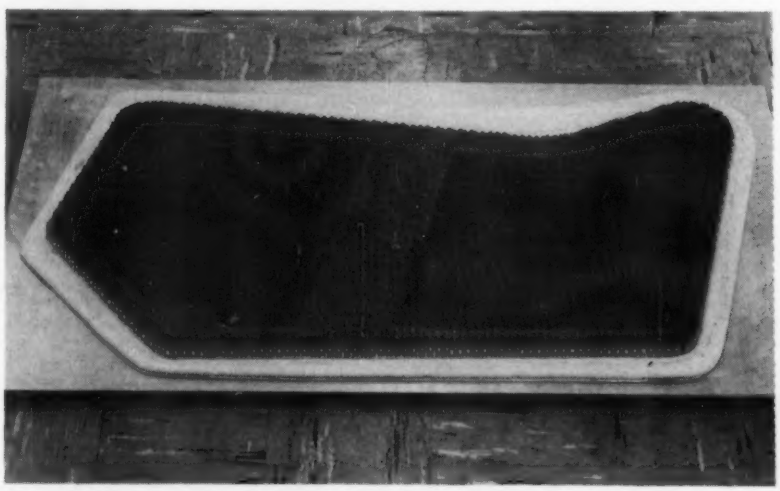
Time of immersion is not critical. As soon as the exposed sections are eaten away, etching stops. Removal of the assembly from the etch bath and a rinse then follow.

The final step in the process consists of removing both the rubber-like material or hot melt and what vinyl mask still remains on the contours. Dressing with fine emery or sandpaper is sometimes required to remove all traces of the masking material. And the hot melt removed from the core can be used again.

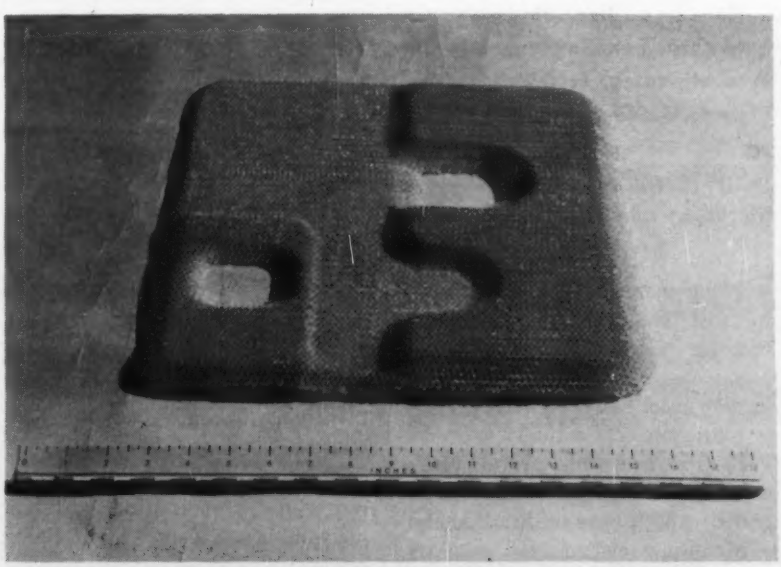
Metal Grades—Metals worked on so far include 5052 and 3002 aluminum alloys and 15-7 and 17-7 stainless steels. From these results, it's evident that the process can be applied to any of these materials.



CONTROLS CELL DEPTH: The plaster negative controls depth of masking material in honeycomb cells. Raised areas will be etched away.



PRESSING ACTION: Honeycomb core presses into the plaster negative to a controlled depth. Contoured effect is the negative's shadow.



FINISHED CONTOUR: Chemical milling process promises savings in time and money spent shaping honeycomb core for sandwich structures.

FAST PICKUP: Vacuum destacker picks up single pre-cut sheets of cold-rolled stock for lateral transfer to tub forming operation. Static controls govern all movements for reliable low-maintenance operation.

New Line Tackles Variety In Sheet-Metal Processing

How do you tame hard-to-handle sheet-metal assemblies?

Here's a line that proves automatic handling can pay off in a stamping, forming, assembly and welding sequence.

By R. H. Eshelman,
Machinery Editor

▪ When searching out fertile areas for cost reduction, don't skip over the big potential in sheet-metal processing. The idea of transfer feeding sheet stock between presses is getting sharper scrutiny.

In this trend, widely varied processes are being successfully integrated. And it pays off handsomely.

Mounting evidence — such as found in the Mansfield, O., appliance plant of Westinghouse—shows how it can be done. Machine designers ars solving tough problems of mechanical handling of larger, more awkward parts, such as the Laundromat outer tub.

Combine on Problems — Engineered by Westinghouse production executives and The Federal Machine and Welder Co., Warren, O., it's a line that deals ingeniously with a number of transfer and handling problems.

C. Reining, Plant Works Engineer, says simply that it's the automatic transfer system of the line that makes it noteworthy. But coupled with that is the use of static controls (Cypak) throughout.

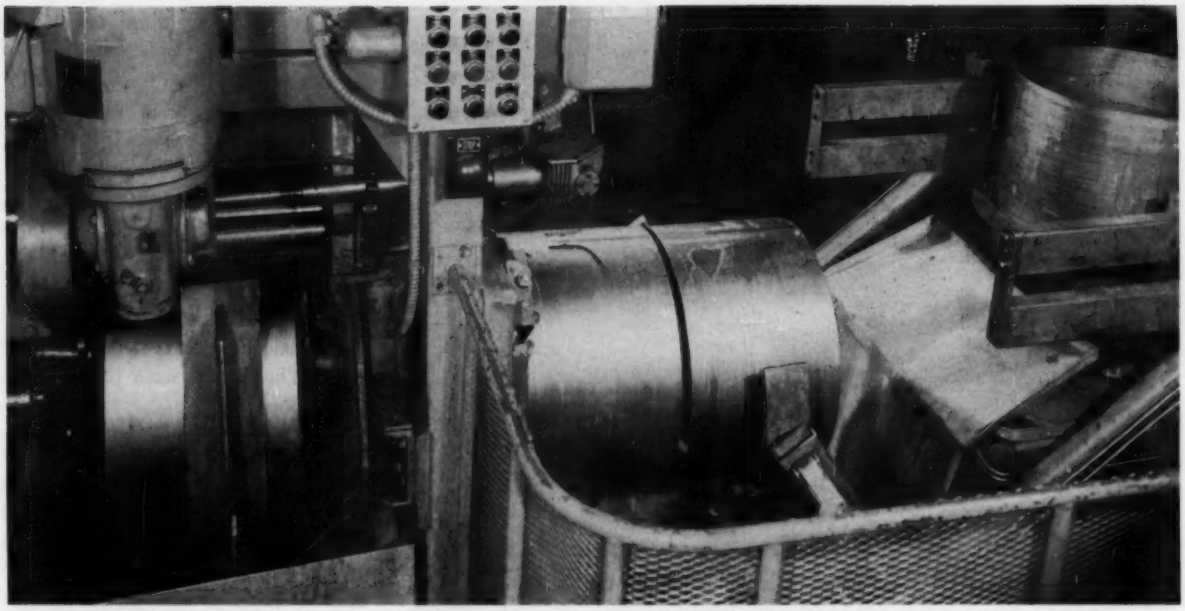
This adds flexibility. "We can try out a single station or an individual machine, if we want," Mr. Reining notes.

Save With Static Controls—The arrangement allows tooling changes in minimum time. There are specific cost and operating advantages to the static controls which have no moving parts.

On a previous transfer line for an oven liner, annual direct labor savings showed a payoff for the added investment in less than 18 months. Projected over a 10-year life, the integrated line shows up as a much better investment than conventional methods.

From this experience with the previous transfer lines, the plant could also expect more uniform quality parts, fewer rejects, less inspection costs and elimination of process-parts float. But cost data on the usual relay controls and a static system reveal some interesting comparisons.

Key in Maintenance—Estimates



FORM AND WELD: Flat stock comes through forming rolls and curls around welding mandrel. Arms on each side hold part for lapped seam weld. Transfer bands (right) pick up cylinders for shuttle to next step.

placed cost of the transfer machine without sequence controls at $248,-593. Regular relays would add $11,070; Cypak static controls, $27,675.

This more than doubles sequence control costs. But as indicated in the accompanying table, experience on a comparable line shows average time used in repairing equivalent static controls is less than 5 pct that for typical relays.

For this reason the entire line was designed with the static system. It has proved trouble-free.

Maintenance and repairs are fast and simple. Savings in downtime and lower operating costs are estimated to recover the added initial investment in the first year.

Varied Operations — The Laundromat outer tub production line combines a variety of forming, welding and stamping operations. For instance, the beginning step is roll forming and seam welding the cylindrical shape.

A vacuum sheet-metal lift automatically picks up a single precut blank and moves it into the forming station. This unit is a typical "pail" welder.

After rolling the sheet, the machine indexes the lapped joint through the welder. It forms a 3/16-in. overlap, ejects the part to the straight-line transfer in the third station.

Further along the line is a hydraulic expander setup that sizes the body, forms flanges and draws the sump. Assembly operations utilize projection and spotwelding and a 360° seam weld.

Transfer Takes Over—The automatic transfer system is actually three units. First is the flat sheet destacker that moves blanks into rolls for forming.

From here the line transfer takes

Key Is Low-Cost Maintenance

1. Conventional Relay Control

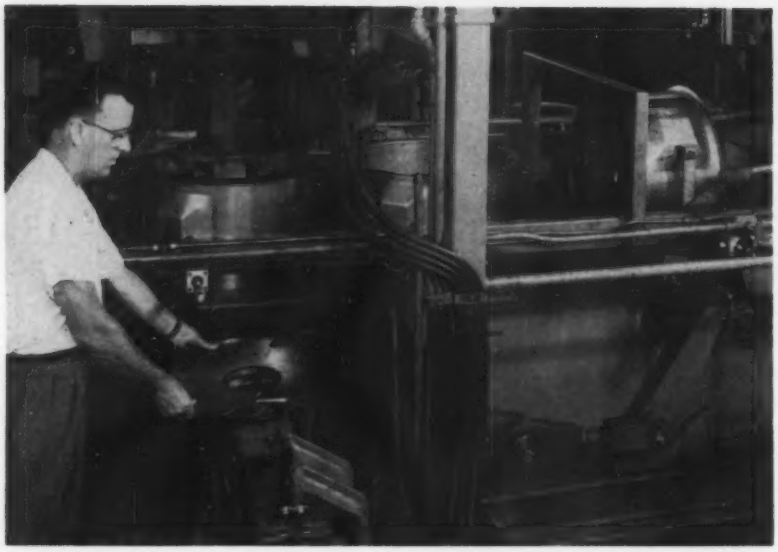
Number of relays checked	2697
Number of relays repaired in one week	141
Average time to repair relays for one week, hours	116
Average repair time per relay, minutes	49.2

2. Cypak Control (Oven Liner Transfer Machine)

Number of equivalent relays	108
Average time to repair system per week, hours	4
Average time to repair "equivalent relay," minutes	2.22

3. Comparative Maintenance

$$\frac{2.22}{49.2} \times 100 = 4.5 \text{ pct of relay maintenance time required for static controls}$$



MECHANIZE ASSEMBLY: Operator loads brackets and tub back for tack welding. Work fixture raises tub to position in welder; floating heads join the circular seam as assembly rotates slightly more than 180°.

LOW-COST MAINTENANCE: Works Engineer, Chris Reining, looks over packaged static control cabinet with maintenance man. Arrangement allows quick plug-in of replacement; lights show defective units.

over. Cam operated transfer arms pick up the open tub cylinder from the seam welder and lift it, turn over 90°, then rotate it 120° to position the seam.

Transfer bars carry the tub through the rest of the stations. It's a mechanically connected system.

The fixture for holding the tub during transfer has a set of rubber-lined bands, each shaped to the arc of the tub. These move in during transfer, to press on the tub, slide it to the next station.

Tooling Hole Helps—A pierce operation punches out a tooling hole. A locating pin on the left transfer band fits in this for positive positioning. The transfer mechanism also uses this hole for leverage in turning over the part.

Two seam welding operations show how much further you can go in mechanized handling sheet metal parts today. First is welding the back.

An operator loads two inner brackets into inner spot weld guns. When this weld is finished, the table drops. The operator then places the back in position.

The transfer moves the tub to the next station and lifts it into floating guns. These tack weld the back in four spots.

Makes Full Turn—The transfer mechanism moves the tub on, lifting it to welding position in the next station. Floating seam-weld heads close on opposite sides. The tub rotates slightly more than 180°, giving a complete weld all around the seam.

When heads are released the tub drops. Blocks on the machine table align the table back to a 180° position.

On the next tub, the drive reverses, welds in the opposite direction. Thus the table returns to its original position.

Rollover Needed—Final acrobatics for the tub is the turnover for loading the washer hub and hub flange. This is performed mechanically with transfer levers. It leaves the tub bottom down.

An operator sets on the hub and flange for loading. But it's picked up and positioned in the tub mechanically for spotwelding.

These manual loading operations could no doubt be made automatic, if justified economically. With four operators, production of the line is 125 units per hour.

It's a big advance in efficiency over conventional processing. In fact there's a sixfold savings in direct labor charges alone.

A parallel spinner tub line shows the further range of automation potential with this type of part. It switches the cylindrical part from a sliding transfer to a 90° upender with a chute roll feed into an automatic roll seamer. This spins on the front and back at the same time.

Let Phosphates Reduce Friction

Machine parts need all the protection they can get. The better the finish, the more mileage you get from a machine.

This phosphate coating does just that.

▪ Wear and corrosion resistance are vital insurance against costly breakdowns in production machinery. One area where this is true is in automatic packaging and bottling equipment.

Since its machines sometimes run at speeds in excess of 240 finished containers per minute, Pneumatic Scale Corp. Ltd., Quincy, Mass., knows how important this problem really is.

The company found one way to maintain long runs: in better finishes of machine parts. Here the choice is either electroplating, hot dip galvanizing, painting, or chemical treatment.

Two Down—Electroplating was ruled out because it wouldn't protect external threads or parts with close dimensional tolerances. On the other hand, the rust-proof coating from hot-dip galvanizing is too thick for threaded or machined parts.

Painting, although good on many parts, can't provide 100-pct protection on gears, cams, bearings, and fasteners. To cover these parts with paint, it takes a buildup of 1 mil or more.

That left Pneumatic Scale with one choice, chemical treatments. Here, there are two general types, black oxides and phosphates. Since one type of phosphate handled three jobs in one, it won the nod over black oxides.

Phosphate Finish — Not only a base for paint, this phosphate can be used as a rust-proof coating and for lubricity on moving parts. A treatment called Endurion combines all three properties in one. Made by Rust Proofing and Metal Finishing Corp., Cambridge, Mass., Endurion does quite a job of resisting corrosion on ferrous parts.

Military specs require thin phosphates to withstand a ½-hour salt spray, and 2 hours for the heavy zinc types, when unoiled, while 36 to 48 hours, when oiled. Manganese phosphates must take 1 to 1½ hours, unoiled, and 24 hours, oiled, under the same test.

In contrast, Endurion stands up to 24 hours of salt spray, unoiled, and 75 to 100 hours, oiled. Its slight buildup, between 0.0002 to 0.0003 in., has no adverse effect on normal fits.

No Rust—Many of the large gears and cams at Pneumatic Scale get a coat of paint on their nonfunctioning parts to match the rest of the machine. And none of these parts shows any sign of rust after three years of storage.

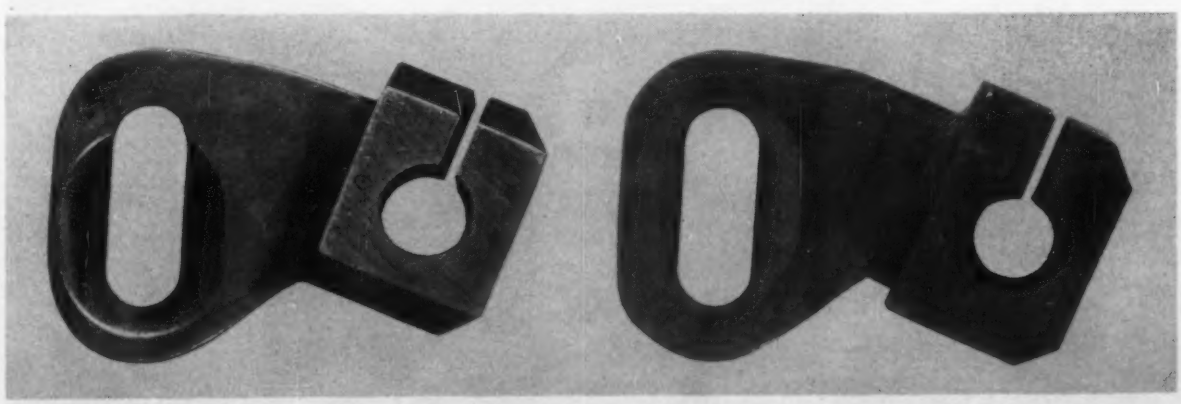
What sort of lubrication job does Endurion do? Such a coating on these parts means longer life. The parts break in smoothly, without the usual seizing or galling. And users report a 2 to 3 times improvement in wear life over standard manganese phosphates.

Easy Method — The Endurion process converts a phosphated surface chemically to form a complex phosphate. As a result, tin replaces a part of the original metal.

The conversion takes place by dipping the phosphated parts in a solution of Endurion. Then it's held at the boiling point for 3 to 5 minutes. Control is by simple titration.

Hides Defects — Endurion also offers color and hiding power. There are eight basic colors to choose from.

According to J. B. Savits, Chief Methods Engineer at Pneumatic Scale, "Any company with the foresight and ability to adapt this process to its own products will be rewarded with improved quality at lower cost."



LESS WEAR: Two friction levers ran side-by-side on a tea-bagging machine for six months. While the case-hardened part (left) wore to a 0.085 in. depth, the Endurion-treated lever (right) wore only 0.001 in.

Cut Machine Time on Tough Part

Five Automatic Turrets Replace Nine Turret Lathes

Updating production methods continues to pay off.

Here's how an auto plant halves machining time on a part with better machines.

■ By going to automatic chucking turret lathes to handle a job that had been done on standard turret lathes, methods men in one plant have cut machining time 46 pct, increased tool life 15 pct, and reduced changeover time 40 pct.

In addition, the setup improves surface finish and more easily holds close tolerances on critical surfaces. Operator productivity is also increased, since the automatic feature frees operators to go on other machines or perform other work.

Scene of this change was the Panhard and Levassor automotive plant in Paris, France. As part of its quality improvement and modernization program, this company investigated methods used to machine steel crankshaft-arm forgings.

The Problem—The methods investigation showed that time cycles were lengthy, work was hard to hold and difficult to machine, and consistent quality was a problem.

The workpiece was a forging for a typical crankshaft arm with an eccentric pin—no easy machining job in anybody's book. A number of close-tolerance operations had to be performed, and satisfactory fixturing in itself was a difficult problem.

Better Equipment?—Determining that better equipment held the solution, the methods engineers took a look at the market.

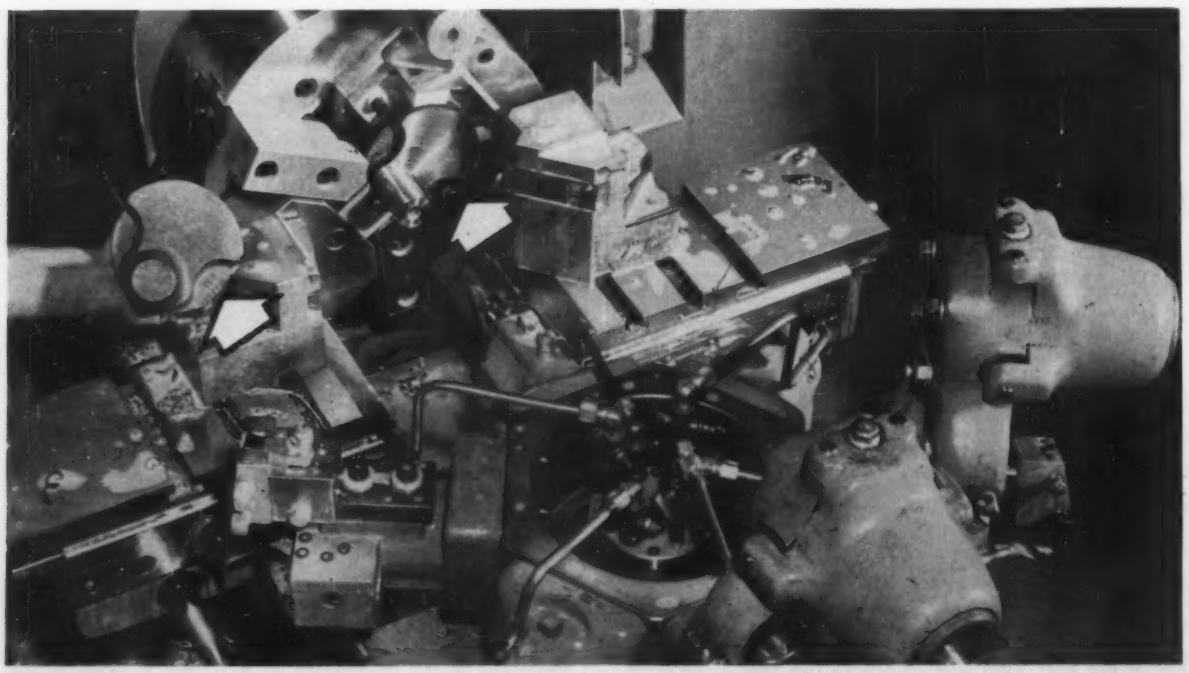
What they hoped to find was something with versatility, quick changeover for different parts and different operations, and consistent quality.

They also sought higher productive capacity and automatic features to maintain correct speeds and feeds for longer tool life and to free the operators for other work. They came up with some machines that are getting pretty impressive results.

The Answer—They decided that Gisholt Masterline 1F Fastermatic Automatic Chucking Turret Lathes met their needs. So well, in fact, that five of these machines, made by Gisholt Machine Co., Madison, Wis., were purchased to do the work of nine older turret lathes.

Apart from special fixturing on the chuck, standard tooling fills the bill, despite the intricacy of some of the work. The machines are set up to handle these unwieldly parts in two fast automatic-cycle operations.

Pin Side — The first operation handles the side of the crankshaft



FIRST OPERATION: Machining is performed with the forging chucked offset to center the eccentric pin.

arm containing the eccentric pin. To center and machine this off-center pin, a special counterweighted chucking fixture is used (which, incidentally, is adjustable for all part sizes).

The part's own counterweight sets off-center in a stationary base to put the pin on center. The part's back face sets against jacks to locate for length.

A V-shaped centralizing jaw grips from the opposite side of the counterweight. Two additional jaws grip the work.

Hexagon turret tools turn, drill, counterdrill, bore, ream, and chamfer the hub, and groove around the base. Front and rear cross-slide tools, in conjunction with turret operations, rough- and finish-face the hub, the counterweight, and the thrust-bearing surface.

Floor-to-floor time is a fast 5.2 minutes.

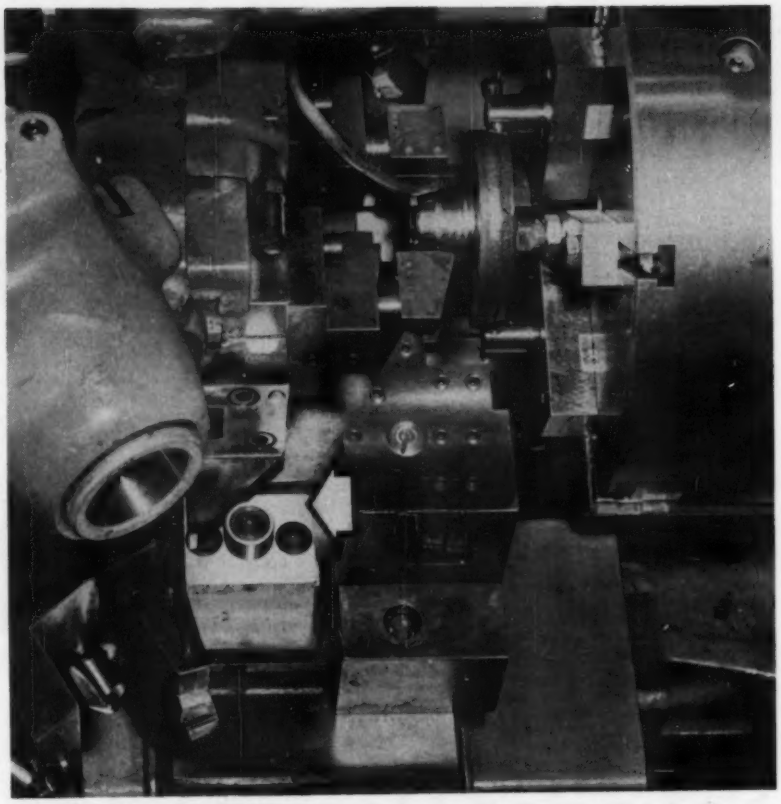
Crank End—The second operation works the crank end of the part. This time, work is held on the machined pin by special offset jaws, and a hand-adjusted setscrew against the counterweight drives the work.

The same operations are performed again on this side in a fast automatic cycle. Cross-slide tools face the hub and cut the outermost groove. Turret tools do the rest, including one operation of particular interest, in which two more grooves are cut.

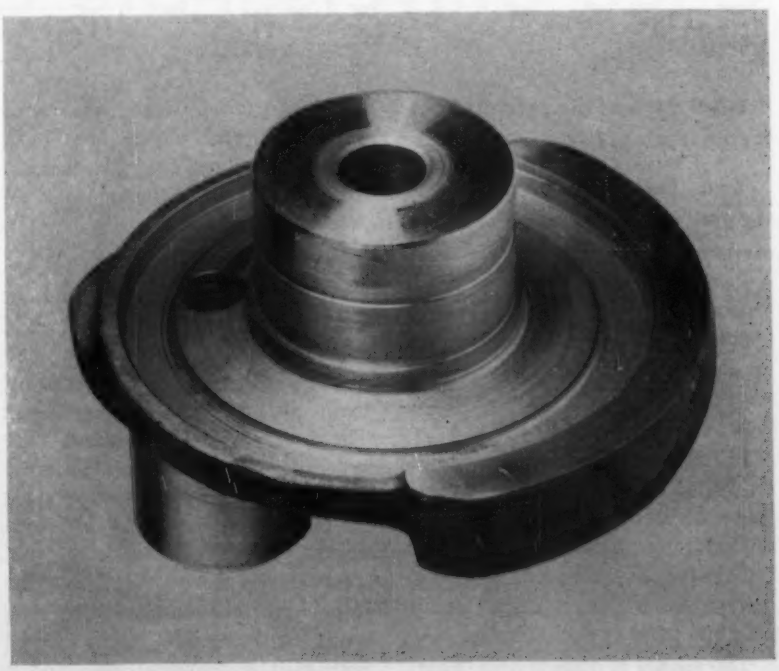
Groove With Cam—Grooving is handled by two tools mounted in a cam-operated, turret-mounted facing slide tool. Tool clearance problems are solved by an angle cam, mounted on the slide tool.

Forward movement of the turret brings the angle cam into contact with a roller bearing on the rear cross-slide. Continued forward travel moves the slide transversely, engaging the grooving tools, one on each side of the hub, to cut one groove in the hub and one in the flange face, completing the operation and the part.

Floor-to-floor time is 4.9 minutes.



SECOND OPERATION: Rear view of tooling pinpoints the grooving setup. The roller-cam arrangement slides the two tools into the hub and across the flange, respectively, to complete the operation and the part.



THE FINISHED PART: Standard tooling and fast, automatic operation team up to machine a tough forging into this intricate part in short order. Machines better suited to the work make a tough job easy.

GOING FISHING: Universal die notches and pierces corner-reinforcement strips in assembling bait boxes.

Sounder Designs, Tougher Steels Gage Universal-Die Output

What type of die setup is best for your plant?

Your line may be a natural for this one, based on a sensible module system.

▪ More than anything else, a profitable blanking setup owes its success to design. Plenty of midnight oil was burned before the setup in Oberlin, Ohio, came into being.

It's used to produce framework for bait boxes at the Oberlin Canteen Co. Designed by Albert Roth of LaGrange Tool and Die Co., LaGrange, Ill., the die blanks, notches, and pierces eight totally different parts.

The answer is quite simple. First, design the die block in sections and then rearrange the sections to produce the part you want. But don't forget the tool steel. LaGrange Tool and Die chose one from Darwin & Milner, Inc., Cleveland, a low-manganese oil-hardening type. And it fills the bill.

Only Ten Die Blocks—The dies at Oberlin work on three different lengths of 0.020-in. galvanized sheet metal. But there are only ten different die blocks. Only two of them are used more than once. There are also four spacers. By arranging the die blocks in three different lineups, you can produce all of the part styles in all three lengths.

In other words, one die-block setup produces both of the long strips. Another setup takes care of both medium-length strips. And a third one provides all five of the short strips.

The boxes for fishermen come in a wide range of sizes. Most of them are made of ½-in. thick industrial fiberboard. The metal framework joins the edges of the fiberboard.

Shear and Bend—First, the parts are sheared to length and width, then notched and pierced. Next, axial bends on the strips produce angles or channel cross sections. Further bending forms rectangular frames. Screws or rivets join frame joints with other angle strips, thus completing the framework along the corners of the box.

The universal die processes two groups of strips, both narrow and wide. The narrow strips bend into "L" cross sections and reinforce the bottom corners of the box. Wide strips, on the other hand, get a channel bend with an outward flange on one leg. They reinforce

the top corners and the opening for the lid.

Chamfer Cuts — Narrow strips start off with chamfer cuts at each end. Next, you blank three "V" notches along each side. Various size holes are then pierced in the strips.

Wide strips get a similar treatment, except that the notches have a parallel wall section. This accommodates the cross section after axial bending. Both strips are made in three lengths, from 27 9/16 to 48 9/16 in. Widths are 1⅛ and 2⅜ in.

Similar Designs—From the standpoint of punch layout, the only difference between strips is the location of chamfer punches, spacing between notching punches, and the absence or presence of round-hole or rectangular punches at specific places.

The punch-holder design is standard in that the punches and punch-holder blocks are mounted on pins and screws. When needed, they're just relocated on the punch holder of the die set. Only the stripper plate need be replaced when changing from one style to another.

Keeps Them in Line—There's a milled groove on the upper face of the die set's shoe. The die blocks locate in this long groove. The blocks are retained in place by clamps that engage grooves along the side of each die block.

Width tolerances of the die blocks and the groove are so close that the groove locates the blocks in one direction. This comes in quite handy. For it means there are only two spots for dowel pins, at the two end blocks in each row.

Tough Steel—Generally, the tool steel used for the blocks and punches conforms to SAE-AISI designation O1. It doesn't warp nor shrink. And it offers a strong, tough blanking edge—one that doesn't have to be sharpened.

The tool steel also has a wide hardening range, resists deformation and deep hardens to ample toughness for the job. Easy to machine, the steel has excellent wear resistance. The tool steel's analysis by percent is: 0.90 C, 1.20 Mn, 0.25 Si, 0.50 Cr, and 0.50 W.

Management's Pleased — The die's been in use for some time now. Mr. Norling, Oberlin Canteen's president, reports no problems at all from a setup standpoint. In fact, it's resulted in a product of higher quality. Costs have tumbled too. The efficient operation spells less scrap.

The thinking behind the new die's design contains much logic. They put it this way. When you're after quality and close tolerances, it's a good idea to specify a setup that makes use of progressive dies. If that's your goal, then labor and tooling costs are less important.

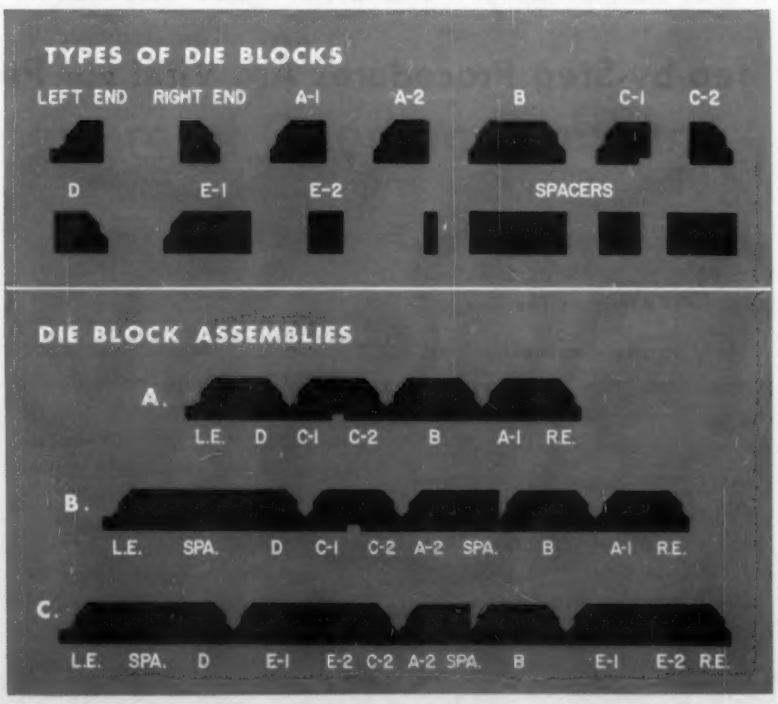
A string of single-operation dies raises a problem of location. But when the parts you're making have similar features, like the ones on the bait boxes, a compound die's your best bet. And it improves accuracy to design one die for each part.

Module System—The boxes are designed on a sort of module system. This insures optimum use of components to suit most box designs. Thus the length between bends of the different strips becomes very important. As such, matching parts do not cause assembly problems. And bending fixtures can handle more than one piece.

Not only that, but pierced hole locations in each strip become important too. Strips can be used for more than one box style. In this way the universal die can guarantee accuracies from one style of strip to the other.

Design is similar with the die. The restangular and round-hole punches are alike. Chamfer and notching punches for the narrow strips are the same, as are the punches for the wide strips.

Fewer Die Blocks Tell the Tale



IMPROVES DESIGN: From a small inventory of only ten die blocks and four spacers, it's possible to turn out eight different parts. Design's importance is stressed by these three parts of varying lengths.

FINISH BY GRINDING: Recommended procedures must be followed for proper grinding of mill rolls.

Remedy Roll Grinding Woes

Step-by-Step Procedures Are Vital For Proper Finishing

By H. E. Balsiger—Director of Engineering, Landis Tool Co., Waynesboro, Pa.

Finishes on sheet and plate are only as good as the finish on the rolls that do the work.

Here is some essential information on this controversial subject.

▪ At certain times in the life of a mill roll, it is refinished by grinding. This is a fairly common operation. But, at times even the highly skilled operators have trouble finishing a roll.

Technicians, who trouble-shoot for the Landis Tool Co., Waynesboro, Pa., find that the bulk of the problems are basic. Operating speeds, wheel selection, use of coolants and lubricants are the usual sources of trouble.

As a result, spirals, scratches, chatter marks appear on the rolls. The following information may be of help. In addition, recommended step-by-step procedures for the grinding of rolls with commercial, semi-finish, and ultra-finish surfaces —the usual classification of mill roll finishes—have been set down.

Follow Basic Rules—These procedures are for guidance only. It may be necessary to alter some steps slightly to obtain a desired surface. However, there are three basic rules that must be followed. These are: gradual reduction of wheel speeds; gradual increases of work speeds; and gradual reduction of traverse speeds.

If the operator follows these rules he will produce rolls to the required finish in a minimum time. He may even vary the procedure.

When should an operator reduce the speed of the wheel? These reductions depend a great deal on the cutting action of the wheel. A reduction can be made at every second or third pass provided a fast-cutting grinding wheel is being used. When using a slow-cutting finer grit wheel, it may be that the wheel speed can only be reduced every third or fourth pass.

Hard and Soft Wheels — The greater the grinding wheel speed,

the harder the grinding wheel acts. More cutting grains contact the work surface in a given period of time. As a result, each grain does less work per revolution of the grinding wheel and fractures less quickly.

On the other hand, a decrease in wheel speed makes a wheel act softer. With the slower speed, each grain does more work per revolution of the grinding wheel and fractures more easily. So the need for proper adjustment is obvious.

Irregular power and belt slippage decrease the efficiency of the wheel. Check these items if a wheel generates excess heat or requires too much power.

Affect The Pattern—Work speed, condition of the wheel face, and traverse speed are the three things that determine the markings or discolorations which form into a pattern on the roll surface. Increasing work speed and reducing traverse cancels out lines generated on the preceding pass.

Condition of the wheel, roll material, and operator skill will determine the number of passes necessary to condition the surface of the wheel and produce an acceptable finished roll.

Here's a point that is often overlooked. It is important in ultra-finish grinding that the wheel does not extend past the edge of the roll more than ⅛ to ¼ in. at the end of a traverse pass. The reason is, that in ultra-finish grinding, the wheel is glazed across the middle of the face.

When the wheel extends too far beyond the edge of the roll, the edge of the roll breaks down this glaze. It then becomes necessary to reglaze the wheel and start the finish grind over again.

Adjust Wheel Feed—Wheel feed per pass will depend largely on the horse power of the wheel drive motor and the cutting action of the wheel. A coarse, open-face wheel can be fed into work much faster than a fine grit wheel.

Most roll grinders have an ammeter that measures the load put on the wheel drive motor as the wheel is fed into the work. If you get a higher or lower than normal reading on the ammeter, correct it by reducing or increasing the wheel feed.

In rough grinding (and in some cases semi-finish grinding), it is extremely important that the ammeter shows a steady amperage pull on the wheel drive motor during the entire traversing cycle on the roll.

For example: If the ammeter indicated 60 amp at the right side of the roll and 40 amp at the left side at the end of a traversing pass, it is certain that more stock was removed at the right side than at the left side. This will cause an undesirable taper to be formed.

Dress Before Use—The edges of a wheel may become chipped through shipment from the factory or in ordinary handling to change wheels. Therefore, when a new wheel is installed, and before any grinding is started, the edges of the wheel should be dressed.

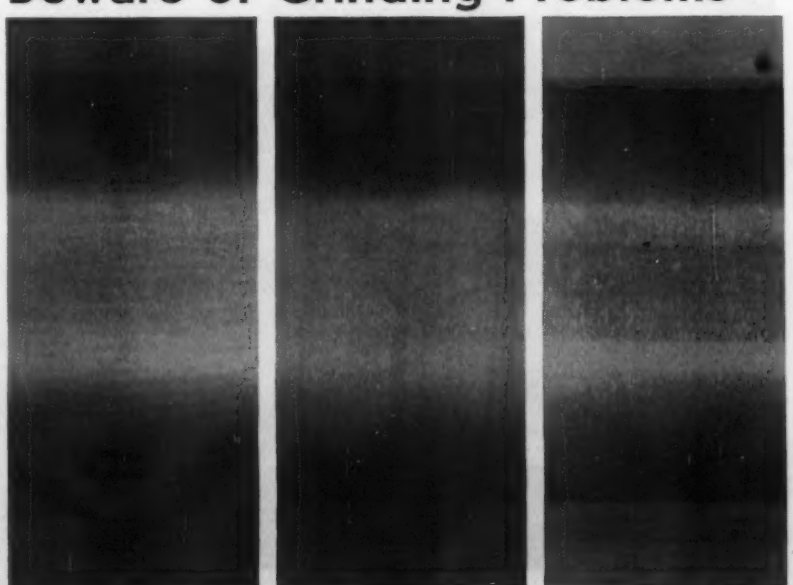
If the same wheel is to be used for rough and semi-finishing, it is very important not to dress the wheel when the rough grind is completed. Permit the wheel to glaze by reducing the traverse rate to an absolute minimum. Two or three passes should be enough to give a properly glazed wheel.

If the wheel does not glaze satisfactorily with this method, make a bag from a loosely knit fabric and fill it with a vegetable soap paste. Allow the bag to drag on the roll directly opposite the grinding wheel. This will ordinarily provide a properly glazed wheel.

Too Much Detergent — In the event the wheel builds up a glaze and then suddenly clears itself, it is an indication that the detergent is too strong. Reduce the amount of detergent in the coolant. It is also advisable not to have too much coolant pressure. This will wash the paste compound off the roll before it reaches the wheel.

What about the finer-grit wheel? If used for finishing, it should be given a very fine diamond dressing. Traverse the diamond very slowly across the face of the wheel. Due to the finer grit, this wheel will

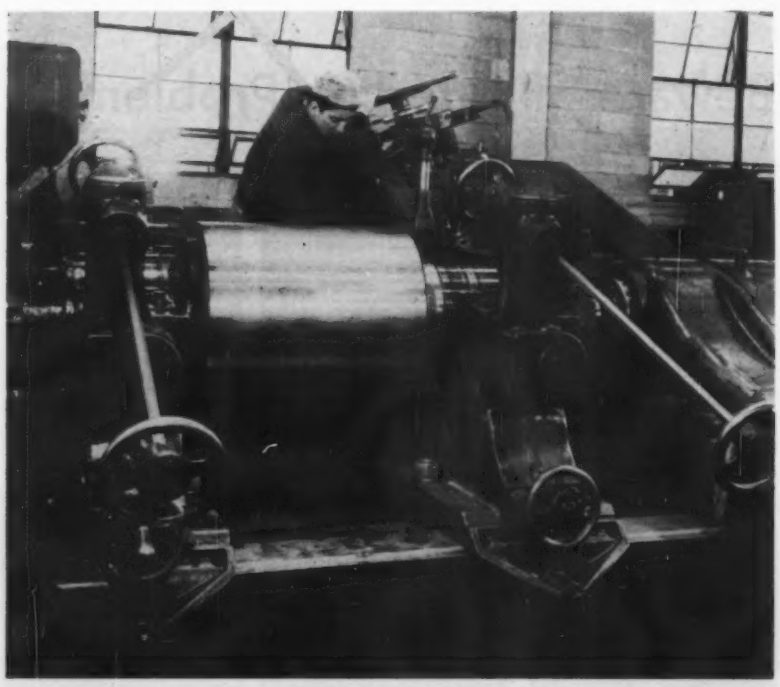
Beware of Grinding Problems



UNACCEPTABLE SURFACES: Chatter marks (left), burning (center), and work scratches (right), are results of faulty grinding techniques.

Ways to Cure Grinding Ills

TROUBLE	CAUSES	CORRECTIVE MEASURES
Chatter marks	Out-of-balance wheel	Check wheel balance
	Too hard wheel	Try softer wheel
	Loaded wheel	Be sure coolant filter is functioning
	Loose spindle bearings	Check wheel concentricity to spindles
	Outside vibrations	Cut other machinery vibrations down
Spirals	Disalignment	Check headstock and footstock
	Rough wheel edges	Redress wheels
	Wheel dressed on a taper	Check condition of diamond and alignment of dresser
Checking	Wheel is being fed into work too fast	Reduce the rate of feed; be sure that a large volume of coolant is used
	Too hard wheel	Change to a softer wheel
Burning	Lack of coolant	Check the volume of coolant
	Loaded wheel	Examine coolant filter
	Feeding the wheel too fast	Reduce wheel feed
	Stopping work while in contact with wheel	Be sure wheel is free from work when stop rotation or traverse
Work scratches	Dirty coolant	Filter the coolant, particularly in finish grinding
	Coarse and too soft wheel	Use a finer grit wheel with harder grading. Follow recommended dressing procedures



WATCH THE EDGE: In ultra-finish grinding, the wheel must not extend too far past the roll edge. Otherwise, wheel glazing will occur.

usually glaze itself, so the paste bag isn't necessary.

The proper coolant for roll grinding should be able to keep the wheel and work clean. Transparency is another important feature. Cloudly or milky coolants make visual inspection almost impossible. For the best results, coolants should be filtered.

Cut Down Friction—Roll neck lubrication is a point of vital importance in roll grinding. A constant supply of the right lubricant cuts friction to a minimum. As a result, there is no heat distortion of the roll necks which may result in an undesirable finish.

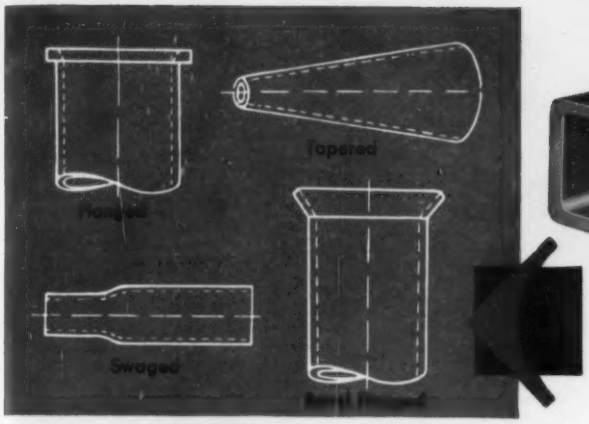
In the event that one roll neck is properly lubricated and the other is not, the roll will develop a sizeable taper if the condition is not corrected. Take precautions to prevent coolant from splashing on the roll necks. Use a lubricant that stays on the roll neck and is not readily affected by coolant spray.

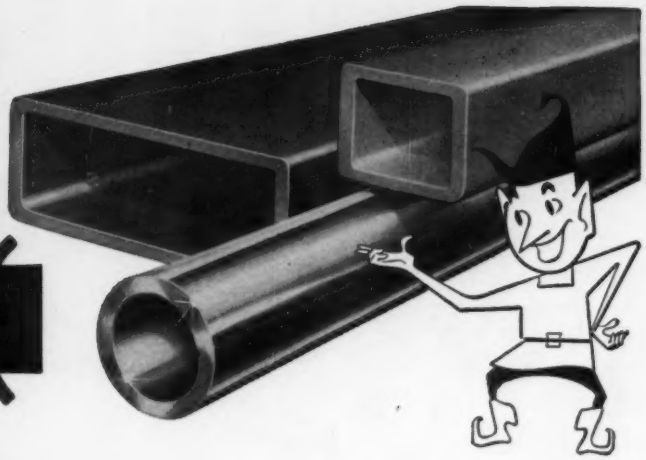
Correct wheel dressing procedure is another important step in obtaining the desired finish on a roll. There are two reasons for dressing the wheel. One is to shape the wheel to concentricity. The other is to restore the cutting surface when the wheel has become loaded.

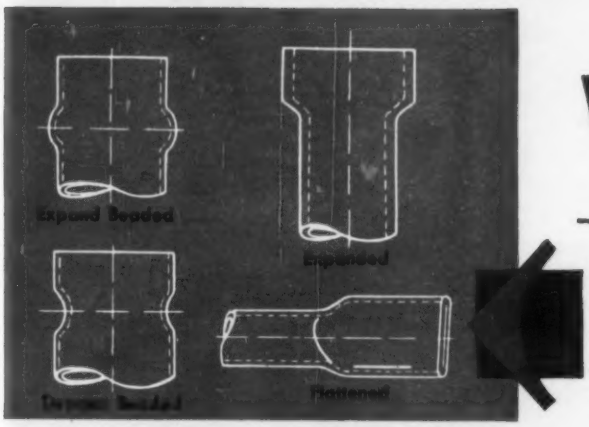
Avoid "Fishtails" — For the dressing operation, a diamond dresser is universally used. It is necessary that the diamond be sharp because a dull diamond will defeat its purpose by actually dulling the wheel.

In dressing, feed the diamond 0.0005 in. on each pass. Traverse the diamond about 6 ipm across the face of the wheel.

The final dressing pass should be done without diamond feed, in the opposite direction to the initial traversal pass. This action removes the sharp peaks from the wheel that might break off as soon as the wheel contacts the work. These loose grains cause "fishtails," and the loose grains may be carried into the cutting area again by the coolant.







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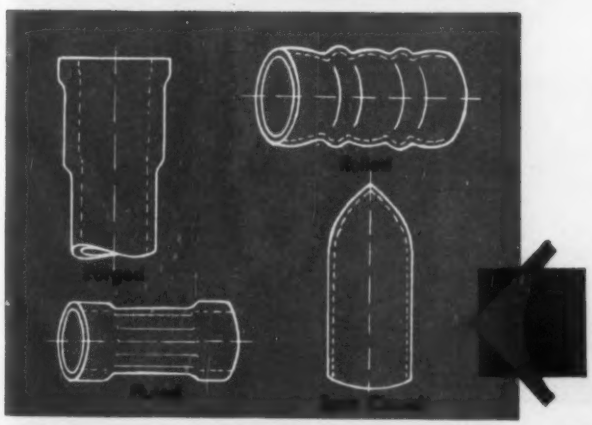

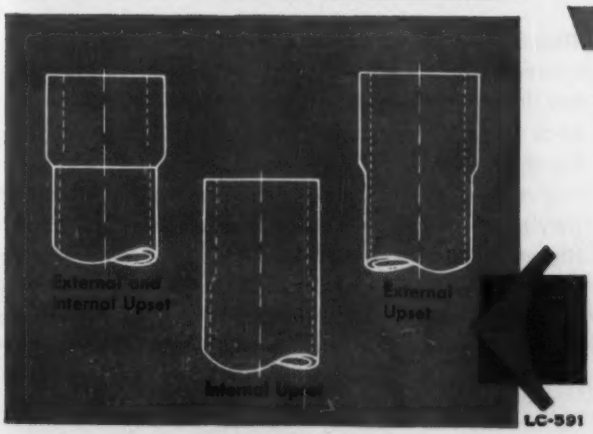

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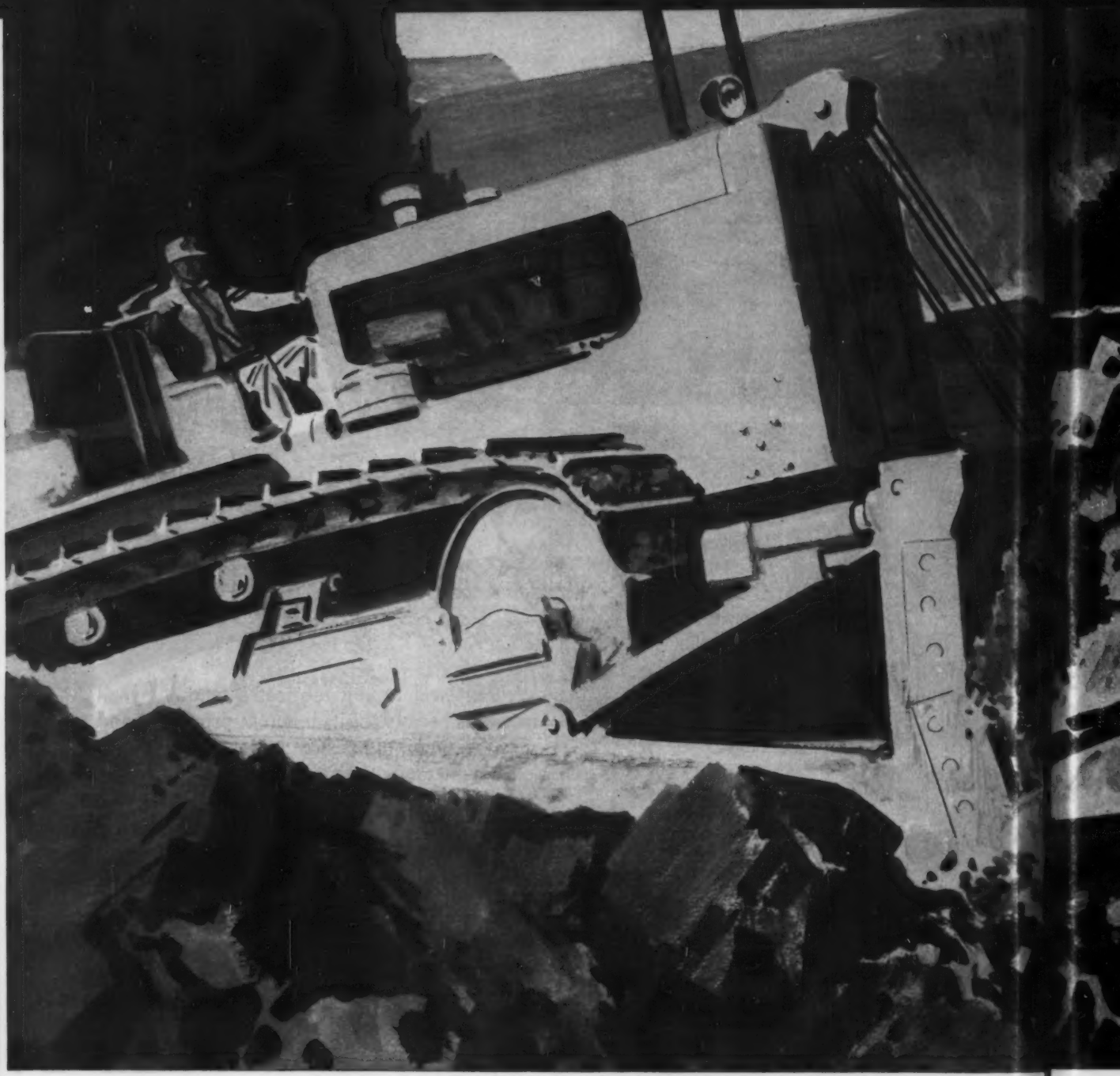

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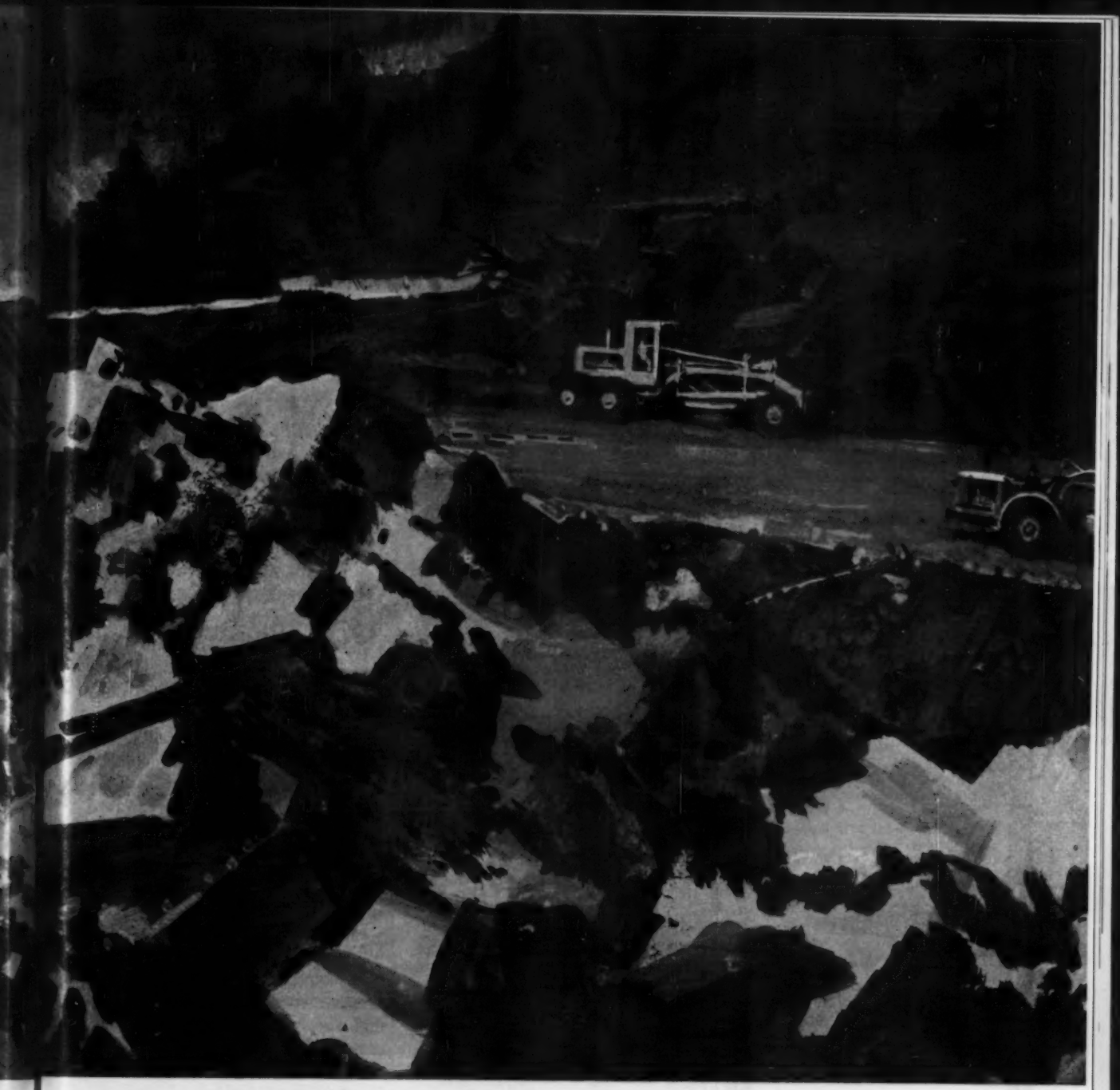

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FREE TECHNICAL LITERATURE

New Catalogues And Bulletins

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, p. 143.

Scale Instrumentation

A bulletin describes a line of electronic scale instrumentation, designed for use in electronic weighing systems and/or to perform automatic recording and controlling functions and transmit the information long distances. (Streeter-Amet Co.)

For free copy circle No. 1 on postcard, p. 143

Superalloys

Two technical bulletins cover performance data on vacuum-induction-melted Udimet 700 and Udimet 41 superalloys. Both are high-temperature, high-stress superalloys presently being used in missile, nuclear, and electronic-tube applications. (Metals Div., Kelsey-Hayes Co.)

For free copy circle No. 2 on postcard, p. 143

Electropolish Liquid

A liquid acid material used to electropolish steel and stainless is fully described in a two-page data sheet. It is also applicable for deburring. (MacDermid Inc.)

For free copy circle No. 3 on postcard, p. 143

OBI Presses

A 28-page bulletin covers a series of open-back inclinable presses featuring an exclusive multi-point mechanical-sleeve clutch. All dimensional and operating data are included, and economical performance is stressed. (Niagara Machine & Tool Works)

For free copy circle No. 4 on postcard, p. 143

Contour Band Saws

An eight-page catalog describes a line of heavy-duty contour band machines. The catalog shows their versatility for filing, polishing, and line grinding, as well as band-sawing of virtually all materials. Accurate control of speed and feed are featured, and a device for positive work-holding is included. (The DoALL Co.)

For free copy circle No. 5 on postcard, p. 143

Super Refractory

A bulletin describes a super refractory which has the valuable high-temperature properties of ceramics, yet withstands severe thermal shock conditions that would shatter virtually all conventional ceramic materials. It has proved useful in a great number of applications involving very rapid temperature changes. (Western Gold & Platinum Co.)

For free copy circle No. 6 on postcard, p. 143

Ore Crusher

A four-page bulletin fully describes the mechanical features of a 36-in. ore crusher. Available with instantaneous hydraulic adjustment for wear and product size, it comes with fine, intermediate, or coarse crushing chamber. The crushing head lowers to release tramp iron

and returns to its original setting automatically. (Allis-Chalmers)
For free copy circle No. 7 on postcard, p. 143

Foundry Exhaust Hoods

A 28-page manual covers exhaust hood designs for the foundry industry. It contains 46 actual installation photographs illustrating applications in all phases of foundry operations. (American Air Filter Co.)
For free copy circle No. 8 on postcard, p. 143

Process Controls

A 12-page brochure presents information on a complete line of process measurement and control equipment. Included are level controls, density measures, fill controls, thickness gages, and a container inspection-rejection system. (Industrial Nucleonics Corp.)
For free copy circle No. 9 on postcard, p. 143

Epoxy Adhesives

A brochure describes epoxy resin adhesive packs and how they are used. They are designed for repair of damaged parts in production operations, and in maintenance. (Fenwal Inc.)
For free copy circle No. 10 on postcard, p. 143

Motors, Generators

A six-page product bulletin covers a line of electric motors, generators, and motor-generator sets, ac and dc, of all types. Motors rate from 1 to 200 hp, motor-generator sets from ½ to 150 kw. (Imperial Electric Co.)
For free copy circle No. 11 on postcard, p. 143

Magnesium Diecastings

A booklet tells the how, why, and where of magnesium diecastings. Cost savings, weight savings, and superior design are stressed as advantages of the process. (The Dow Metal Products Co., Div. of the Dow Chemical Co.)
For free copy circle No. 12 on postcard, p. 143

Worm-Gear Reducers

Single-reduction worm-gear speed reducers, with a new high-load-ca-

Zincilate WST-200

Zincilate WST-200 sets in 30 minutes or less, "locking" the honeycomb section securely and safely in position for machining. In 15 minutes or less, every trace of WST-200 is rinsed away in a simple hot water dip, leaving the honeycomb spotlessly clean, ready for perfect brazing.

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3,000-lb — cushion tires

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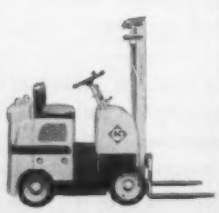

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ALLIS-CHALMERS AC

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FREE LITERATURE

pacity thread form and utilizing high-strength materials, are described in a 32-page illustrated catalog. Various mounting arrangements are available. (De Laval Steam Turbine Co.)

For free copy circle No. 13 on postcard, p. 143

Pipeline Meter

A 12-page brochure completely explains the functions, applications, and operation of a high-capacity "Turbo-Meter" for use in petroleum pipelines. It has a capacity of 15,000 gal per hour. (Rockwell Mfg. Co.)

For free copy circle No. 14 on postcard, p. 143

Ductile-Iron Valves

A four-page bulletin describes a line of ductile-iron regulators and control valves. It shows how ductile iron is able to replace steel in many applications at considerable cost savings. (Jordan Corp.)

For free copy circle No. 15 on postcard, p. 143

Dust Collectors

A technical bulletin describes mechanical dust collectors including a new involute design, a new hopper discharge valve, and larger-diameter tubes. The involute design is specifically designed for efficient collection of abrasive or heavy dust loadings. (Research-Cottrell, Inc.)

For free copy circle No. 16 on postcard, p. 143

Permanent Magnets

An engineering bulletin describes in detail the characteristics of the new Hyflux Alnico V-7 permanent-magnet material, with energy product values of 7 million. (The Indiana Steel Products Co.)

For free copy circle No. 17 on postcard, p. 143

Air-Line Lubricators

A circular covers a line of lubricators for pneumatic lines. They can be automatically kept filled with oil, insuring against pneumatic equipment's being operated without oil. (Wilkerson Corp.)

For free copy circle No. 18 on postcard, p. 143

A 3M Case History Report

CONTOUR POLISHING

DEBURRING-POLISHING TIME CUT 40% WITH "PG" WHEELS

MANUFACTURER: LeTourneau-Westinghouse Company

ADDRESS: Peoria, Illinois

PRODUCT MANUFACTURED: Earth Moving Equipment

3M ABRASIVE USED: "PG" Wheels

HOW 3M ABRASIVES ARE USED: "PG" Wheels used for contour polishing of air brake backing plate. Malleable cast-iron plate requires super-smooth finish on two concentric rings, to provide air-tight seal against neoprene air diaphragm.

OPERATIONAL DATA ON 3M METHOD: Two 1" x 10" "PG" Wheels, Grit #150 Three-M-ite Resinbond Cloth, mounted side-by-side on shop-made polishing shaft uniformly deburr and polish plate ring surfaces in 2-3 minutes.

OPERATIONAL DATA ON PREVIOUS METHOD: Overall deburring and polishing was by hand-rubbing with emery cloth. Time required was 4-6 minutes per plate.

PROVEN ADVANTAGES OF 3M METHOD: "PG" Wheel method, as opposed to hand finishing, allows more uniform finishing as abrading pressure can be more constantly applied with machine. Average time saving of 40% realized.

WANT MORE INFORMATION? Send for free manual, "Modern metal finishing with 3M 'PG' Wheels." Write to 3M Co., St. Paul 6, Minn., Dept. AAS-109.

"PG" Wheels are manufactured in U.S.A. by 3M Company, St. Paul 6, Minn. Export: 99 Park Avenue, New York. Canada: London, Ontario

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AMERICAN WELDING

FREE LITERATURE

Continued

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Bench Turret Drill

A leaflet describes a bench-model six-spindle turret drilling and tapping machine, and stresses the savings it brings in machining time, machine investment, tooling, and floor space. Available accessories are listed. (Burgmaster Corp.)

For free copy circle No. 19 on postcard

Safety Glasses

A 12-page catalog outlines a complete line of safety glasses, in a complete size range, in four frame styles, with and without side shields. The manufacturer's Calobar lenses are available for use in environments subject to glare and/or harmful rays. (American Optical Co.)

For free copy circle No. 20 on postcard

Template Drill Bushings

A 16-page catalog specifies a line of self-clinching template drill bushings designed for quick, easy installation in drill templates made from thin-gage aluminum alloy or cold-rolled steel. (Penn Engineering & Mfg. Corp.)

For free copy circle No. 21 on postcard

Lift Truck Control

A four-page bulletin describes Monotrol, one company's lift-truck control system designed for speed and precision in close-quarters operation. (Hyster Co.)

For free copy circle No. 22 on postcard

Motor Starters

An eight-page folder covers a complete line of non-reversing combination starters through NEMA Size 4. These starters come with either motor circuit switches or circuit breakers. (Cutler-Hammer Inc.)

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Welding Turning Rolls

A four-page brochure describes and specifies a line of turning rolls designed to provide steady, positive rotation for mechanical welding. They are used for rotating a workpiece about its horizontal axis or supporting cylindrical objects of all kinds on their OD's. A wide range of types and capacities is included. (Aronson Machine Co.)

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Vibration Pads

A four-page brochure describes Fabcel Pads for machine mounting, designed to damp out destructive shock, vibration, and noise. Made of Neoprene, they have recesses on both sides to provide suction grip and, in many cases, eliminate bolts, lag screws, and cement. (Fabreeka Products Corp.)

For free copy circle No. 25 on postcard

High-Strength Steel

A 24-page booklet describes a high-strength steel for use in aircraft, missiles, and rockets. Called "Potomac A," it is a chromium-molybdenum-vanadium steel which has served for some time as a highly effective hot work die steel. (Allegheny Ludlum Steel Corp.)

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Bolt Tension Calibrator

A reprint of a feature article describes a bolt tension calibrator for testing torque-tension relationships for different bolt, nut, and washer combinations. Its application has helped some companies reduce fastener inventories. (Skidmore - Wilhelm Mfg. Co.)

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Specialty Steels

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FREE LITERATURE

formation on all types of special steels and alloys. A tool-steel selector chart is included which enables matching of tool steels. Tables show properties and workability of major types of stainless steel and high-temperature alloys. Information is included on special-purpose alloys, tubing, and pipe, and fine wire specialties. (The Carpenter Steel Co.)

For free copy circle No. 28 on postcard

Low-Temp Phosphater

Two technical bulletins describe a low-temperature phosphating compound and procedures, respectively, for spray-washer application and dip application. Operating at a temperature as much as 75°F lower than conventional phosphating compounds, it gets equal results. It can effect cost savings of 75 pct in steam, water, electricity, and downtime costs alone. (Turco Products, Inc.)

For free copy circle No. 29 on postcard

Chipbreaker Drill

A leaflet describes a new design chipbreaker drill which breaks and controls chips, reduces chip size, retains positive rake, penetrates easily, has long life, and saves time and money. It will outperform regular drills altered to include conventional types of chipbreakers. A specification-type order form is included. (Chicago-Latrobe)

For free copy circle No. 30 on postcard

Speed Reducers

A 65-page catalog covers a line of the author company's "Hi-Line" series of fin- and fan-cooled speed reducers. (The Ohio Gear Co.)

For free copy circle No. 31 on postcard

Airtight Blind Rivets

A two-page circular presents the new closed-end "Pop" rivet, a blind rivet which is pressure-tight up to 500 psi. Complete engineering and size specifications are presented on the three diameter sizes, ⅛, 5/32, and 3/16 in. These rivets are inserted and set from the head side, expanding the end by withdrawing a mandrel, which breaks off after doing its job. There are flush-head and domed-head types. ("Pop" Rivet Div., United Shoe Machinery Corp.)

For free copy circle No. 32 on postcard

Die Cushions

A 16-page catalog describes a line of die cushions including pneumatic, hydro-pneumatic, and hydraulic types. Size and capacity data are given, as well as information on typical arrangements. (Verson All-steel Press Co.)

For free copy circle No. 33 on postcard

Splined Mill Cutters

A four-page circular presents a new line of splined milling arbors and cutters, designed to greatly reduce torsional deflection. They increase cutter life, bring 90- to 400-pct greater stock removal, and permit machining of high-strength alloys at conventional speeds and feeds. They are available in diam of 1, 1¼, 1½, and 2 in., in standard lengths with 50-mm taper, with other lengths to order. (Pratt & Whitney)

For free copy circle No. 34 on postcard

Steel Handling

New "mechanized" methods that speed the handling of heavy steel products up to 50 pct for one company are outlined in a report by a manufacturer of forklift trucks, material carriers, and industrial tractors. (Towmotor Corp.)

For free copy circle No. 35 on postcard

CO_2 for Testing

A six-page brochure describes the uses of carbon dioxide for low-temperature environmental testing. Advantages of CO_2 as a coolant in such testing are outlined. (Pure Carbonic Co., Div. of Air Reduction Co.)

For free copy circle No. 36 on postcard

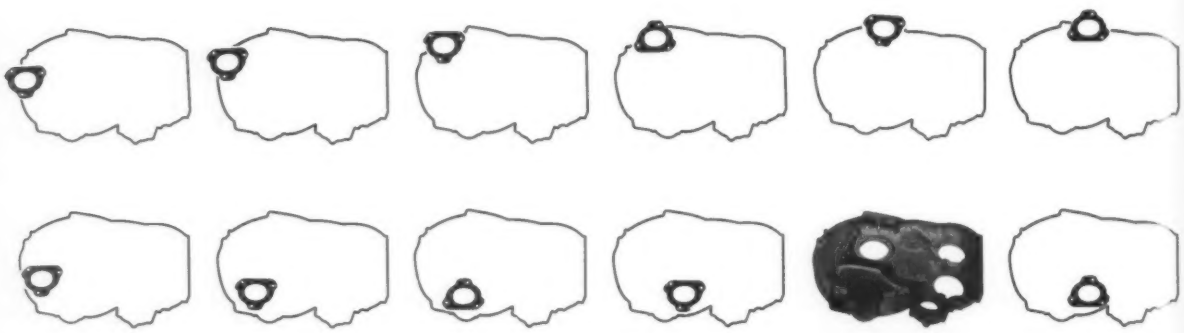
Right now! Numerical control like this can produce for you

. . . Turn the page to see how this Natco does it.

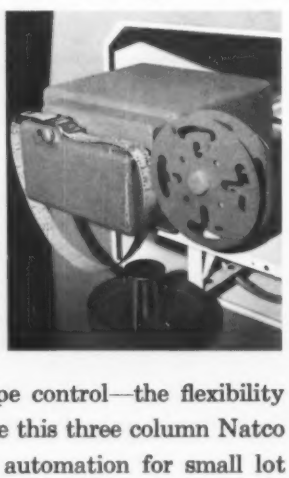
Tape Control Speeds Production

This workpiece comes in many varieties . . .

One multi-spindle Natco machines them all



Numerical control for the production line? Sure! And it's paying its way machining starter holes in over 160 different flywheel housings for small diesels. Even though the starter mounting pads are located differently on each of the housings, this Natco handles each new part with equal ease. It bores the hole for the starter pinion shaft; drills and taps three mounting holes around it.



That's the beauty of tape control—the flexibility it gives machine tools like this three column Natco special. Here's practical automation for small lot production!

It's easy and fast to change to a different part. Just substitute a new tape loop in the reader and rotate the drillheads to the new setting. In minutes you're cutting metal again.

No battery of expensive fixtures needed with this machine—the tape locates the part under the drillheads by controlling the motion of the worktable. And inventory can be cut to the bone because even small lots of service parts are run at production part cost.

Production lines don't have to wait until tomorrow for numerical control. It's here now, and now is the time to gain the greatest advantage. Let us show you how it can be used to speed your boring—drilling—facing—tapping—reaming jobs. Call your Natco representative today, or write for details.

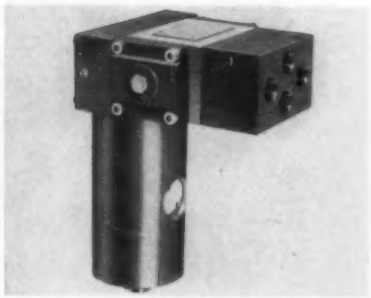
NATCO NATIONAL AUTOMATIC TOOL COMPANY, INC., RICHMOND, IND.

New Materials and Components

Hydraulic Probe Unit for Tracer Control

A hydraulic probe unit is available for tracer controlling on any type machine tools. Extremely sensitive, it is designed for single-axis tracing. It is very accurate, and combined hysteresis and dead space is under 50 millionths. Two models are offered, with probe stable at operating pressures from 200 to 3000 psi. At 1000 psi, one has a 5-gpm capacity with 1-gpm flow rate per 0.001 in. stylus deflection. These figures are double for the other model. (Tracer Control Co.)

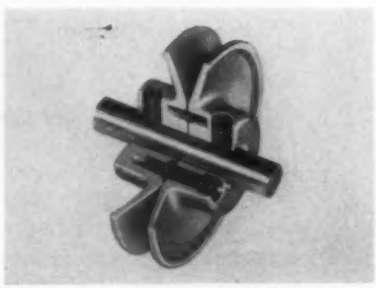
For more data circle No. 37 on postcard, p. 143



No Misalignment in New Variable-Pitch Pulley

Both halves of a new variable-pitch pulley are fastened directly to the motor shaft, eliminating any parallel or angular misalignment between halves. Pitch adjustment is made with a connecting cap screw; then the fastening setscrew is tightened, securing the variable half to the shaft. Thus the variable runs truer and is always in perfect balance. Coming in 3¼-in. diam, with ½- to ⅝-in. bore sizes, it can be used with ⅜-, ½-, and ⅝-in.-top-width V-belts. (Congress Drives Div., Tann Corp.)

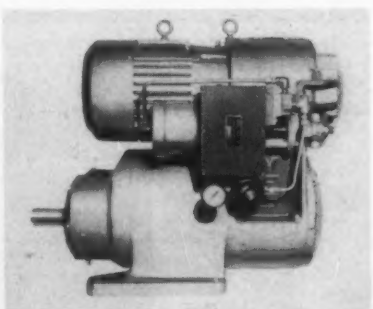
For more data circle No. 38 on postcard, p. 143



Enables Constant Cutting Speeds on Lathes

A unit overcomes the problem of decreasing cutting speed as lathe tools approach center. It is a packaged adjustable-speed drive that automatically maintains constant cutting speeds. Its adjustable-speed motor drives the lathe spindle. As the cutting tool traverses the face of the work, a pneumatic positioner receives an air signal indicating a change in working diameter. A pneumatic control automatically corrects spindle rpm to maintain constant cutting speed. Manual spindle-speed control is also provided for. (Reeves Pulley Div., Reliance Electric and Engineering Co.)

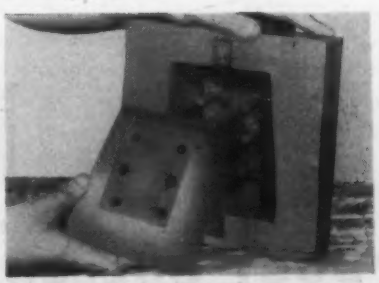
For more data circle No. 39 on postcard, p. 143



Plastic-Ceramic Forms Durable Buffing Jigs

A new material combines ceramic's heat- and wear-resistance with plastic's durability to make rugged, long-life buffing fixtures. A ceramic is molded, then impregnated with a high-temperature resin. Fixtures so made withstand buffing-compound abrasion, which wears away conventional steel tooling, and maintain size longer than epoxy tooling, due to high heat-resistance. The material is available either as finished tooling, or as raw materials for fabrication. (Duramic Products, Inc.)

For more data circle No. 40 on postcard, p. 143



The most efficient operating cyclone collectors made

Design makes the difference: in over a thousand plants across the continent, Buell Cyclones have *proved* themselves more efficient than any other cyclones made. Buell's exclusive Shave-off port (A), traps the extra percentage of dust that ordinary cyclones lose. And large-diameter (B), custom-engineered design eliminates bridging, clogging, or plugging during operation, keeps efficiency high without interruption. Regardless of your present or planned plant layout, Buell equipment can be designed to solve your dust collection problems efficiently and economically. There's valuable information in a concise booklet, "The Exclusive Buell Cyclone". Write Dept. 42-J, Buell Engineering Company, Inc., 123 William Street, New York 38, N. Y.

BUELL CYCLONES

"SF" ELECTRIC PRECIPITATORS

PRECIPITATOR-CYCLONE COMBINATIONS

Buell Cyclones before installation at a major plant.

buell

Experts at delivering Extra Efficiency in

DUST COLLECTION SYSTEMS

DESIGN DIGEST

Hardened Shapes

New additions to a line of ready-made standard hardened shapes bring the total to 12 cross-sections in over 80 sizes. They are useful for dies, die sections, flange sections, ways, gibs, rails, wear plates, and many other uses. Lengths run up to 120 in., with cutting, forming, or wear surfaces already machined, hardened and ground. A soft steel backing is easily machined. Aluminum-bronze wear plates are included in the line. (The Ohio Knife Co.)

For more data circle No. 41 on postcard, p. 143

Aluminum Cleaner

A tumble-cleaning compound for aluminum finishing removes oil, dirt, and aluminum dust and grindings from parts in a single operation, producing a silvery, lustrous surface with sufficient lubricity to enable parts to slide freely during automatic feeding operations. (Frederick Gumm Chemical Co., Inc.)

For more data circle No. 42 on postcard, p. 143

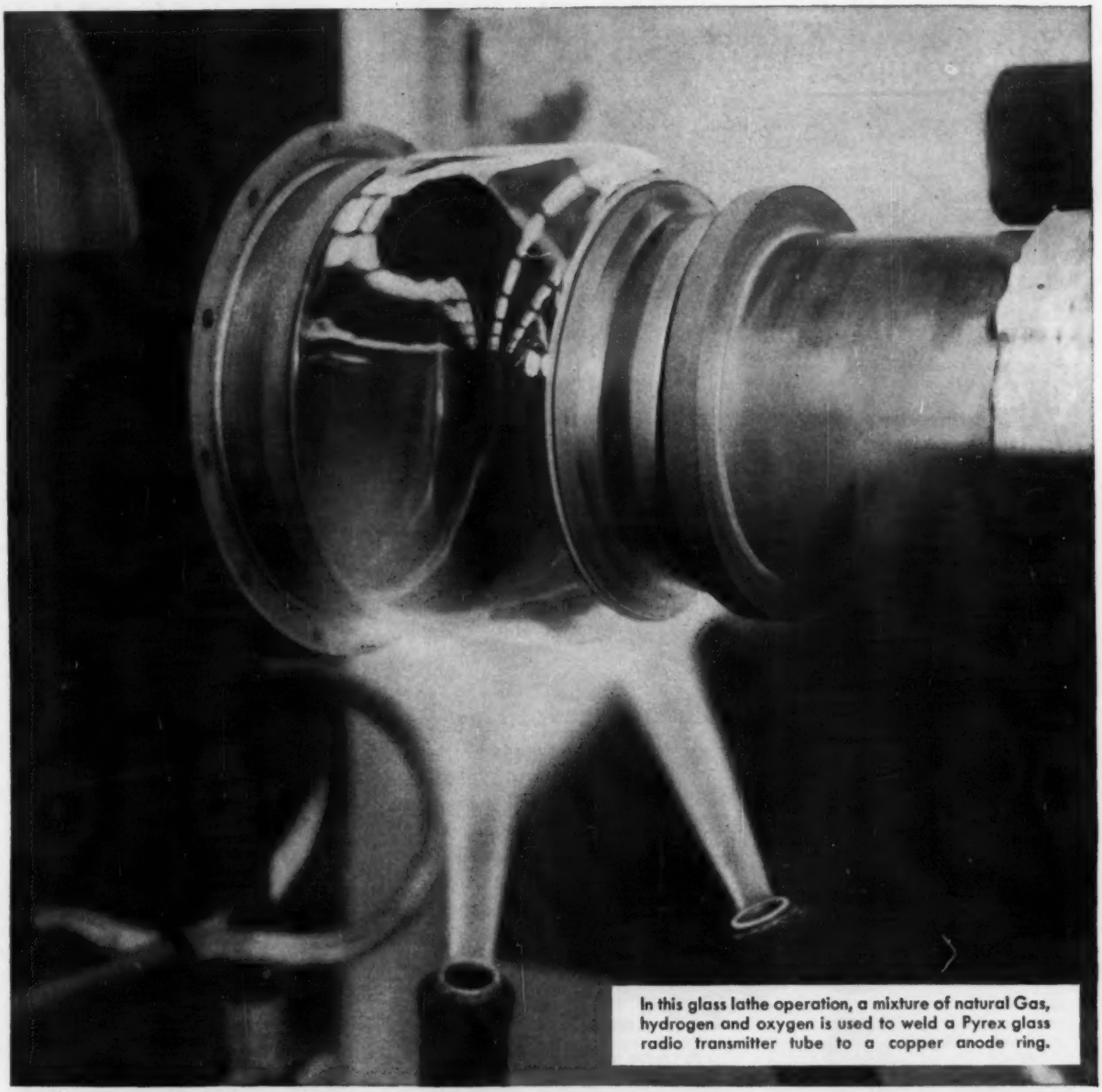
High-Temp Lubricant

A lubricant has been developed that has excellent load-carrying strength and tremendous heat, acid, and pressure resistance. It is disposed to remain chemically stable inside drying ovens and kilns, and thus provides excellent lubrication for roller bearings in drier cars or other equipment exposed to heat. It withstands heat to 1900°F. (Lubrication Engineers, Inc.)

For more data circle No. 43 on postcard, p. 143

NEW BOOK

"Practical Design of Sheet Metal Stampings," by Federico Strasser, shows the factors in the design of metal stampings which permit economical and trouble-free production. Also covered are basic rules and concepts of stamping techniques. 134 pp. $10 per copy. Chilton Co.



In this glass lathe operation, a mixture of natural Gas, hydrogen and oxygen is used to weld a Pyrex glass radio transmitter tube to a copper anode ring.

RCA welds glass to metal at over 2000° F. ...thanks to GAS

Natural Gas is used to weld glass to metal in the production of radio and television tubes of many types at the RCA Electron Tube Division plant in Lancaster, Pennsylvania.

To effect the weld at over 2000° F., a mixture of natural Gas, hydrogen and oxygen maintains the high welding temperature on the Pyrex glass and metal parts as they rotate on a glass lathe. A Gas flame is then used to control and equalize the cooling of the glass down to the 900-600° F. range.

For information on how Gas can help you in your production operations, call your Gas Company's industrial specialist. He'll be glad to discuss the economies and superior results you get with Gas and modern Gas-fired industrial equipment. *American Gas Association.*

•

See Playhouse 90 with Julia Meade on CBS-TV. Watch local listings for time and station. Sponsored by your Gas Company and the Gas Industry.

New Equipment and Machinery

Electric-Discharge Machines Work Clean and Fast

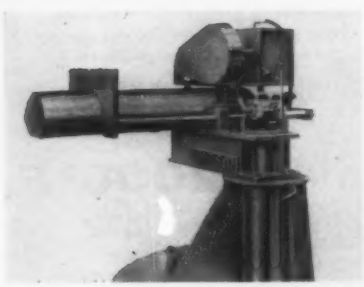
New electric-discharge machines, to be seen at the Metal Show, rapidly remove metal without sparks, without heat, and without any wear of the tools. They can drill holes or sink cavities of any shape into exotic, high-strength metals unmachinable by ordinary cutting tools. The removal process imparts a highly polished surface to many of the new high-temperature alloys, and its accuracy is comparable with that of ordinary drilling and cutting operations. It can remove a depth of ⅓ in. over a postage-stamp area in one minute. (Anocut Engineering Co.)

For more data circle No. 44 on postcard, p. 143

Tenth-Interval Plug Gages Come at Low Cost

Low cost of new plug-gage sets permits fast and accurate inspection anywhere, because they can be used as expendable items where and as required. They are made to intervals of 0.0001 in., 12 up and 12 down from nominal in each set, at a cost comparable to that of work gages. Lapped to 1-microin. finish, they are cold-stabilized during heat-treating. Sets come in sizes from 0.120 to 1 in. Sizes 3/64 to 3/32 in. are super-finished. Replacement gages are available at low cost. (Deltronic)

For more data circle No. 45 on postcard, p. 143



Coil Receiver Doubles Slitting Capacity

A new coil receiver has been added to the Paxson slitting system. It takes slitted bands off the recoiler and swings them out of the way, ready for handling. With this method the slitter is freed immediately for continuous operation. Plants using this system report greatly speeded production. It is ruggedly built in both left- and right-hand models. Heights and diameters are custom-tailored to individual requirements. (Industrial Machine Representatives Co.)

For more data circle No. 46 on postcard, p. 143

Continuous Polishing Mills Work up to 60 fpm

New polishing mills provide a continuous automated method for abrasive-belt finishing of sheets and plate 3-ft long and up, as well as coils, from 20 to 60 fpm. Continuous operations use a number of the mills in line. Tolerance of ±0.001 in. can be attained with sufficient passes. Work pressure is adjustable. Units are made to handle widths of 30, 40, 54, or 74 in. Precision is insured by heavy-duty pinch rolls, mist lubrication, worm-gear drives, and full adjustments. (Acme Mfg. Co.)

For more data circle No. 47 on postcard, p. 143

High-Speed Punch Press

To be exhibited at the Metal Show, a new single-station, high-speed punch press has a throat depth capacity of 30 in. For straight-line punching, it will handle a 30-in. workpiece of any length, using a multiple-stop gaging system. For production punching, with a duplicator operating on the pantograph principle, maximum work size is 25 x 30 in. Hole-punching capacity runs from a 3½-in. hole in 16-gage mild steel to a ½-in. hole in ¼-in. mild steel, with a tolerance of ±0.005 in. It will also do fast straight-line nibbling and contour shearing. Quick-change punch-and-die tooling enables very fast changeovers. (Wales-Strippit, Inc.)

For more data circle No. 48 on postcard, p. 143

Jig-Borer Tool Cabinet

The numerous gages, fixtures and special tools used with jig borers and jig grinders all have a place in a new steel cabinet. A large plastic

work surface for drawings is provided. Construction is strong and dust-free. There are separate models for boring and grinding accessories. (Vidmar, Inc.)

For more data circle No. 49 on postcard, p. 143

Space Heaters

Portable space heaters, burning liquid petroleum gas, provide temporary heat to keep workers warm in areas not served by central heating. They are also useful for preheating engines and thawing out machinery and materials left out in the cold. (Stow Mfg. Co.)

For more data circle No. 50 on postcard, p. 143

A SPECIAL OFFER TO ENJOY . . .
THE TRULY DIFFERENT NEWSWEEKLY!

DISCOVER a *different* newsweekly designed expressly for you! For only Newsweek concentrates on the news of direct personal significance to you, your family, your career or business!

Yes, for the next 40 weeks – for about 7¢ a week – Newsweek guarantees to bring the news *most meaningful to you!*

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Try Newsweek on this special introductory offer – 40 weeks for only $2.87 – at about 7¢ per week! These same issues would cost 11¢ per copy on our regular subscription – 25¢ per copy at your newsstand! Read just three issues–You *must* be satisfied, or receive a refund on the unfulfilled portion of your subscription! Send no money now, unless you wish. Mail the coupon below today!

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Meet the "MECHANICAL CHEF"... and its helper, Stainless Steel!

Ravioli is destined for even greater popularity . . . thanks to this unique "mechanical chef".

With it, volume production is possible—quality can be easily maintained. The operator simply fills the hoppers—the "chef" automatically rolls the dough, inserts the stuffing, shapes and cuts the ravioli...at *18,000* pieces per hour. Dough thickness and stuffing quantity can be precisely controlled for uniform taste and peak flavor.

Stainless steel is specified for all working parts . . . to assure purity, meet sanitary codes. Stainless provides corrosion resistance, easy cleaning—and economy, through trouble-free operation and extended life. The ravioli "chef" is made of stainless steel rounds, squares, flats, sheets—even *welded* and *seamless* tubing. And every bit of stainless is obtained *overnight*—from Frasse.

It pays, when you're working with stainless, to work from Frasse stocks. Frasse carries every rolled form—in a wide range of sizes and analyses... delivery is immediate. You'll like the freedom of choice Frasse stainless stocks provide...find satisfaction in having a reliable source for *everything* in stainless. Call us.

Call FRASSE 1st for COMPLETE STAINLESS STEEL SERVICE

Bars	Tubing
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The Iron Age Summary

Consumer Goods Hit by Shortage

The steel shortage has grown to the extent that consumer durables will be in short supply this fall and winter.

1959 models of many products are sold out and 1960's are slow to move in. Quality problems result from steel obtained from marginal sources.

▪ Shortages of some consumer durables are in sight this fall and winter. Because of the prolonged steel strike, many manufacturers of these products have already had to cut back or shut down.

Regardless of the actual date of the strike's end, further cutbacks for a period of weeks are inevitable.

Weeks to Start Up—These shortages are not likely to reach the critical stage. But the consumer's range of choice on most cars, refrigerators, washers and dryers will be limited.

The most optimistic time table for returning to production shows that major steel users who are now without steel will have to wait weeks before they can get their own production lines going.

Tough on 1960's—Already, with most General Motors cars out of production, dealers have only a token supply of new models. Other automakers are in better shape. But they are still likely to suffer before steel moves again in balanced supply.

Many appliance dealers are out of 1959 models, and 1960's are slow coming in. This situation will grow progressively worse until new supplies of steel are coming in from the mills.

Conversion Deals—To get back into production, major steel consumers are making elaborate conversion deals to line up ingots and slabs. These will be channeled to steel mills that are able to get their rolling mills working, but do not have the semi-finished steel in pipelines.

Delays in the Taft-Hartley injunction killed any hope of avoiding a serious ore pinch this year. With cold weather coming and Great Lakes seamen now scattered and at work on winter jobs, not enough ore can come down the Lakes to stave off the shortage.

Ore Emphasis Shifts — But the length of the strike is now turning the ore supply situation the other way. Here's why: With about four months' supply on the ground at mills and lower Lakes ports, steel mills could operate through November, December, January and February on existing supplies. Emphasis will now shift to making the earliest start next March.

Steel users who are fighting the battle to draw the last ounce of production from available steel are running into expensive quality problems. They are finding that steel from marginal sources is giving them quality headaches. Vendors in particular are running into serious and expensive rejection problems.

After the mills start up, users of cold-rolled products will face the greatest frustration.

Steel Output, Operating Rates

Production (Net tons, 000 omitted)	This Week 368	Last Week 368	Month Ago 368	Year Ago 2,024
Ingot Index (1947-1949=100)	22.9	22.9	22.9	126.0
Operating Rates				
Chicago	5.0	5.0	5.0	88.2
Pittsburgh	4.0	4.0	4.0	69.5
Philadelphia	12.0	12.0	12.0	74.0
Valley	10.0	10.0	10.0	63.5
West	0.0	0.0	0.0	79.5
Cleveland	0.0	0.0	0.0	80.0
Detroit	23.0	23.0	26.0	81.0
Buffalo	0.0	0.0	0.0	78.0
South Ohio River	66.5	69.5*	72.0	82.0
South	12.5	12.0	12.0	63.5
Upper Ohio River	55.5	55.0*	56.0	90.0
St. Louis	103.0	108.5*	97.0	96.0
Aggregate	13.0	13.0	13.0	75.0

*Revised

Prices At a Glance

(Cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	6.196	6.196	6.196	6.196
Pig Iron (gross ton)	$66.41	$66.41	$66.41	$66.41
Scrap No. 1 hvy (Gross ton)	$46.17	$45.17	$43.17	$42.50
No. 2 bundles	$31.50	$30.50	$29.17	$28.83
Nonferrous				
Aluminum ingot	26.80	26.80	26.80	26.80
Copper, electrolytic	30-31.5	30-31.5	30-31.50	29.00
Lead, St. Louis	12.80	12.80	12.80	12.80
Magnesium	36.00	36.00	36.00	36.00
Nickel, electrolytic	74.00	74.00	74.00	74.00
Tin, Straits, N. Y.	101.75	102.125	102.50	97.125
Zinc, E. St. Louis	12.5-13	12.00	12.00	11.00

Order Plating Equipment Now

Sales in plating machinery are brisk and the price line can not be expected to hold too long.

Backlogs are double 1958 levels, but deliveries are still normal.

▪ Fast ordering on plating machinery may be a money-saving move. Delivery times so far are normal, but buying is brisk and upward pressures on prices can not be contained indefinitely.

Sales of plating equipment in the first eight months of 1959 are 56 pct over last year, and total year's sales should be about 40 pct over '58, estimates C. H. Reeme, president, The Udylite Corp.

Backlogs are running at about double 1958 levels. Deliveries, however, are normal and should continue so barring a sharp increase in orders. For Udylite, at least, steel supplies are adequate for production as far as can be determined now. But the steel strike is affecting sales, with interested buyers tending to delay ordering. Foreign competition, has not yet penetrated the equipment business.

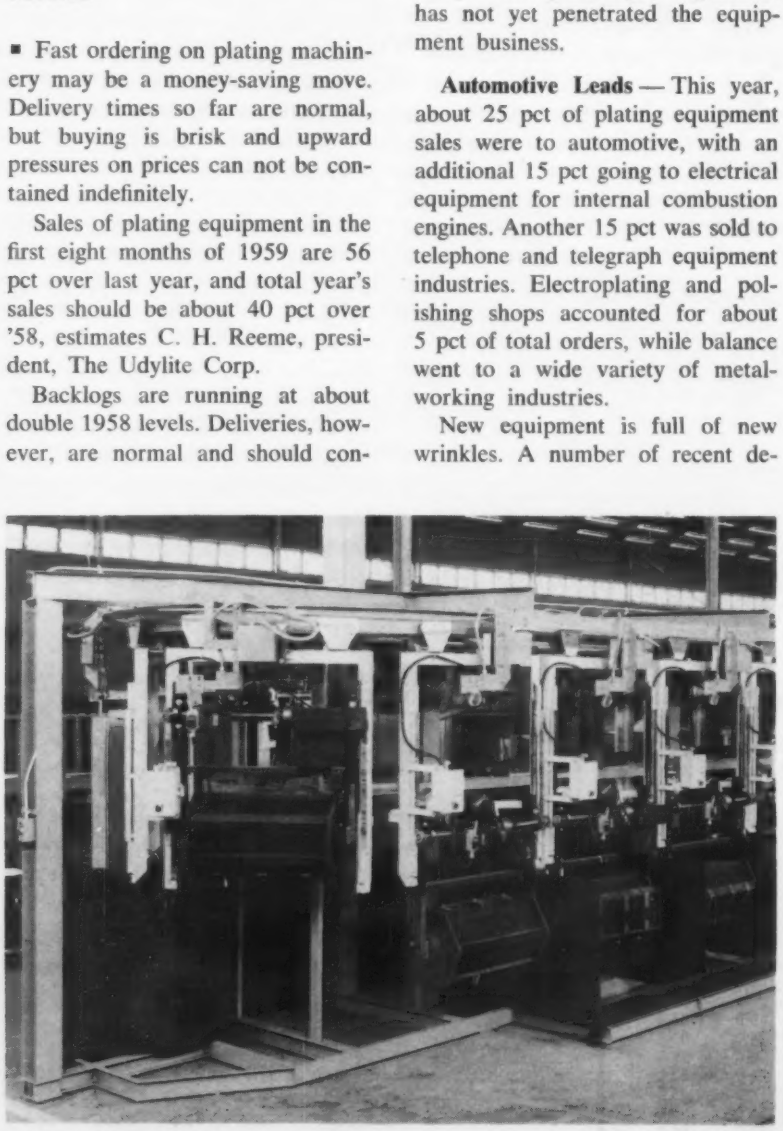
Automotive Leads — This year, about 25 pct of plating equipment sales were to automotive, with an additional 15 pct going to electrical equipment for internal combustion engines. Another 15 pct was sold to telephone and telegraph equipment industries. Electroplating and polishing shops accounted for about 5 pct of total orders, while balance went to a wide variety of metalworking industries.

New equipment is full of new wrinkles. A number of recent developments in chemical processes have induced changes in plating specifications of many manufacturers. These in turn have meant changes in plating equipment. These changes plus constant drive for higher production have brought many instances of revamping existing automatic and semi-automatic equipment. And almost all new machines incorporate changes unheard of a year ago.

Long Range—New chemical developments have had long-range impact too. Chrome plating, especially for auto brightwork, appeared on the skids a little while back. But technical improvements have buttressed its position, shined up the outlook for plating equipment sales.

One interesting development is the entry of smaller production shops as customers for automated plating machinery. Until recently, these shops could not afford the available fully automated units. But new models now put the advantages of automation within the financial reach of many of these companies. Some of the new machines are bulk platers, and simply automate barrel plating lines. But the same advantages are now found in rack plating equipment.

Strong Trend—Plating equipment makers report that the trend to automatic equipment continues strong. Platers simply cannot ignore the savings possible through automation. But smaller shops continue to have trouble justifying the initial outlay. Hence there is a tendency to shy away from semi-automated equipment on the part of small users. They feel that semi-automated equipment is too expensive without the full benefits of completely automated models.



AUTOMATIC V. I. P.: Developed by The Udylite Corp., the V. I. P. machine is typical of automatic equipment now widely in use in the plating field.

FROM GENERAL ELECTRIC . . .

NEW *Polyseal** *Insulation Systems*

• Sealed Against Contaminants

• Help Cut Motor Costs

MOTOR SAVINGS OF UP TO 50% are now possible by applying General Electric motors with Polyseal insulation systems in many outdoor, high moisture, dust and other severe atmospheres which formerly required additional enclosure protection.

POLYSEAL INSULATED COILS are vulcanized and cured—to bond and seal the supported silicone rubber tapes. Every coil must pass an underwater hi-pot test to make sure it is positively sealed against moisture and other contaminants.

THIS NEW GENERAL ELECTRIC INSULATION system also provides greater thermal, voltage and environmental endurance than conventional systems. For added mechanical strength, glass fabric supporting materials are imbedded in each layer of tape. Each coil is wrapped with many layers of this tape. Coils are securely held in the motor by G.E. patented tying and bracing techniques.

ALSO AVAILABLE IN G-E RANDOM-WOUND MOTORS, the Polyseal system is used for stator and end turns, sealing windings with a waterproof, inert covering.

FOR MORE INFORMATION on Polyseal Insulation Systems, call your nearby G-E Apparatus Sales Office, or write for bulletin GEA-6889, Section 884-4, General Electric Co., Schenectady, N. Y.

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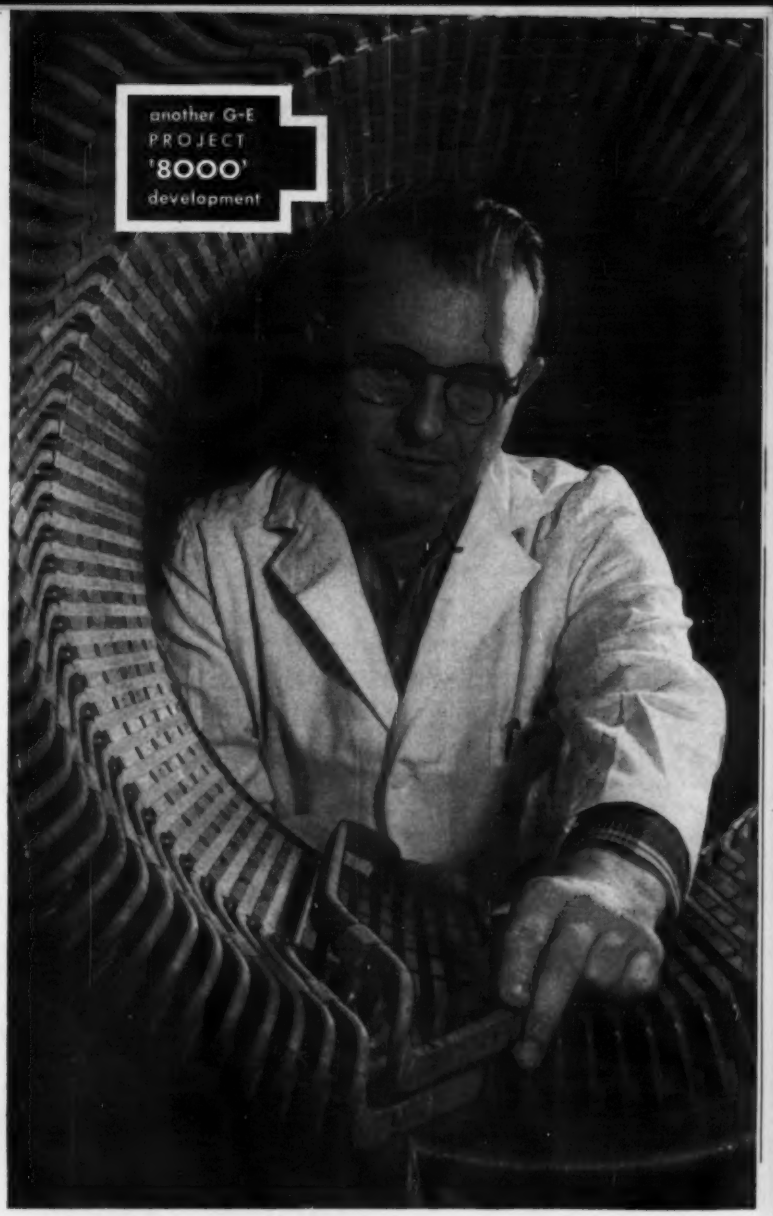
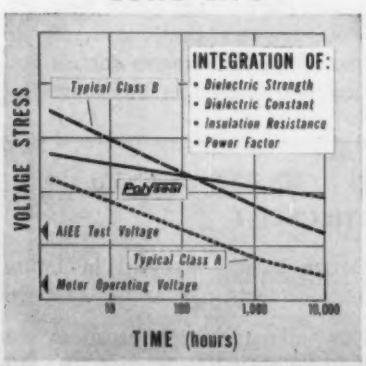


FULLY SUPPORTED

Using specially developed G.E. supported silicone rubber tape, Polyseal is the first silicone rubber insulation system on the market that is fully supported against mechanical breakdown.

LONG LIFE



Tested over long periods of time with voltage applied, General Electric's new Polyseal silicone rubber insulation systems retain a much higher dielectric strength than other commonly-used insulations.

COMPLETELY SEALED

Positive lead seal is provided by special silicone rubber compound which vulcanizes the lead tubing to the silicone rubber wall of the coil. This effectively seals the coil against contaminants.

Warehouse Stocks Near Bottom

Users won't get much help from service center steel until the mills can refill warehouse shelves.

Much of the tonnage left now is in little used items or locked in warehouses closed by the strike.

▪ Until mills start up, steel users are just about at the end of the line. Warehouse inventories — the last strong source of supply—are exhausted.

Service center stocks, built up to 3.7 million tons before the strike, are now down to 1.5 million tons, according to the American Steel Warehouse Assn. Much of this tonnage is in little used items. Some is in warehouses closed by the strike.

Midwest Worst Area — Tightest area in terms of warehouse supply is the Midwest, followed by the East, the South, and the West. Even in the Farwest, previously the best area supply-wise, shortages are mounting.

"We're really hurting," says the sales manager for a West Coast service center. "All of a sudden, light and heavy plate are almost nonexistent. A week or so ago you could still get all you needed."

Bar Critical—On a nation-wide basis, stocks of cold-rolled and galvanized sheet are long gone. Newest item in critical supply is cold-finished bars. Inventories of independent producers helped until recently. Now these, too, are exhausted.

The situation in hot-rolled bar is little better. Only the "cats and dogs are left," according to one warehouseman. "Even the substitutions are getting embarrassing," he adds.

Service centers feel they are about through, sales-wise, for 1959. Many are looking ahead to re-building inventories when mills start up. They are concerned because the build-up looks like a long, slow process. Mill production delays, order backlogs, and quota restrictions will hamper warehouse buying well into 1960.

Sheet and Strip—Sheet users face tough supply problems when the mills re-open. Sheet mills will try for an all-out production push. But, especially in cold-rolled sheet, they face long operating cycles and a shortage of slabs and hot-rolled bands. An additional hazard for users: Mill quotas. One **Eastern** mill now operating will not accept January orders for either hot- or cold-rolled sheet. Users will go back on the mill's books in February and March for previous quota tonnages.

Automakers continue trying to line up slabs or ingots for conversion into sheet. In this way they expect to cut days from normal mill processing time.

The automakers, who are desperate to keep up the momentum of their new 1960 models, are trying to locate and place semi-finished steel with mills whose pipelines were emptied, or will have an excess of rolling capacity after the strike's end.

Plates and Shapes—Defense priority orders for heavy steel may scramble delivery timetables when mills start up. Rated orders for plates and shapes will get first call under government directives. Mills estimate the tonnage involved may not be large. But it's effect will mean some delay on other orders.

Service center stocks of plates and structurals have reached the point of no return. Light plate has been scarce, but now heavier gages of plate are also disappearing. Structural buyers could have trouble with supplies all during 1960. Demand from the building industry and railroad car builders will help keep the market tight.

Pipe and Tubing—Major oil producers are entering heavy new orders for seamless pipe and tube with mills. While these orders are filled for direct delivery to users, there will be little chance to rebuild stocks at mill downriver depots.

Some shipments of standard pipe may be made soon after mills start up. Pipe mills have some finished and in-process stock on hand. After this, however, other orders will wait until new steel is put through the mills.

Mystic Shuts Down — Decreased demand for pig iron in the New England market has closed down the Mystic blast furnace in Everett, Mass. In announcing the shutdown, Eastern Gas & Fuel Associates, the owner, said there are no present plans to resume operations. Employees affected will be transferred to other Eastern operations or given help in locating jobs elsewhere. Mystic will continue supplying customers from existing stocks of basic, foundry, and malleable pig iron until these are exhausted.

PURCHASING AGENT'S CHECKLIST

Design trends expected in future machine tools. P. 86

How miniaturization broadens the field for electro-hydraulics. P. 119

Automatic handling line pays off in sheet-processing. P. 124

COMPARISON OF PRICES

(Effective Oct. 27, 1959)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price changes from previous week are shown by an asterisk (*).

	Oct. 27 1959	Oct. 20 1959	Sept. 29 1959	Oct. 28 1958
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	5.10¢	5.10¢	5.10¢	5.10¢
Cold-rolled sheets	6.275	6.275	6.275	6.275
Galvanized sheets (10 ga.)	6.875	6.875	6.875	6.875
Hot-rolled strip	5.10	5.10	5.10	5.10
Cold-rolled strip	7.425	7.425	7.425	7.425
Plate	5.30	5.30	5.30	5.30
Plates, wrought iron	13.55	13.55	13.55	13.55
Stainl's C-R strip (No. 302)	52.00	52.00	52.00	52.00
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	$10.65	$10.65	$10.65	$10.30
Tin plates, electro (0.50 lb.)	9.35	9.35	9.35	9.00
Special coated mfg. ternes	9.90	9.90	9.90	9.55
Bars and Shapes: (per pound)				
Merchant bar	5.675¢	5.675¢	5.675¢	5.675¢
Cold finished bar	7.65	7.65	7.65	7.65
Alloy bar	6.725	6.725	6.725	6.725
Structural shapes	5.50	5.50	5.50	5.50
Stainless bars (No. 302)	46.75	46.75	46.75	45.00
Wrought iron bars	14.90	14.90	14.90	14.90
Wire: (per pound)				
Bright wire	8.00¢	8.00¢	8.00¢	8.00¢
Rails: (per 100 lb.)				
Heavy rails	$5.75	$5.75	$5.75	$5.75
Light rails	6.725	6.725	6.725	6.725
Semifinished Steel: (per net ton)				
Rerolling billets	$80.00	$80.00	$80.00	$80.00
Slabs, rerolling	80.00	80.00	80.00	80.00
Forging billets	99.50	99.50	99.50	99.50
Alloys, blooms, billets, slabs	119.00	119.00	119.00	119.00
Wire Rods and Skelp: (per pound)				
Wire rods	6.40¢	6.40¢	6.40¢	6.40¢
Skelp	5.05	5.05	5.05	5.05
Finished Steel Composite: (per pound)				
Base price	6.196¢	6.196¢	6.196¢	6.196¢

	Oct. 27 1959	Oct. 20 1959	Sept. 29 1959	Oct. 28 1958
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$70.57	$70.57	$70.57	$70.57
Foundry, Southern Cin'ti	73.87	73.87	73.87	73.87
Foundry, Birmingham	62.50	62.50	62.50	62.50
Foundry, Chicago	66.50	66.50	66.50	66.50
Basic, del'd Philadelphia	70.07	70.07	70.07	70.07
Basic, Valley furnace	66.00	66.00	66.00	66.00
Malleable, Chicago	66.50	66.50	66.50	66.50
Malleable, Valley	66.50	66.50	66.50	66.50
Ferromanganese, 74-76 pct Mn, cents per lb‡	12.25	12.25	12.25	12.25
Pig Iron Composite: (per gross ton)				
Pig iron	$66.41	$66.41	$66.41	$66.41
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$47.50*	$46.50	$45.50	$45.50
No. 1 steel, Phila. area	46.50*	44.50	43.50	39.50
No. 1 steel, Chicago	44.50	44.50	40.50	42.50
No. 1 bundles, Detroit	40.50*	39.50	39.50	35.50
Low phos., Youngstown	48.50*	47.50	45.50	46.50
No. 1 mach'y cast, Pittsburgh	55.50*	54.50	53.50	51.50
No. 1 mach'y cast, Phila.	53.50	53.50	52.50	49.50
No. 1 mach'y cast, Chicago	64.50	64.50	62.50	53.50
Steel Scrap Composite: (per gross ton)				
No. 1 hvy. melting scrap	$46.17*	$45.17	$43.17	$42.50
No. 2 bundles	31.50*	30.50	29.17	28.83
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.50-15.50	$14.50-15.50	$14.50-15.50	14.50
Foundry coke, prompt	18.50	18.50	18.50	18-18.50
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	30-31.50	30-31.50	30-31.50	29.00
Copper, Lake, Conn.	31.50	31.50	31.50	29.00
Tin, Straits, N. Y.	101.75†	102.125	102.50	97.125
Zinc, East St. Louis	12.5-13	12.00	12.00	11.00
Lead, St. Louis	12.80	12.80	12.80	12.80
Aluminum, virgin ingot	26.80	26.80	26.80	26.80
Nickel, electrolytic	74.00	74.00	74.00	74.00
Magnesium, ingot	36.00	36.00	36.00	36.00
Antimony, Laredo, Tex.	29.50	29.50	29.50	29.50

† Tentative. ‡ Average. ** Revised.

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo and Birmingham.

Steel Scrap Composites

Average of No. 1 heavy melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

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Dissatisfied with present recruiting methods? The IRON AGE Employment Exchange is the meeting place for employers and men qualified in all phases of metalworking. For advertising rates, write to Chestnut and 56th Sts., Philadelphia 39.

Trade Senses High Post-Strike Prices

Scrap prices continued to climb this week and the stage seems set for further increases.

As the possibility looms of a settlement in the steel strike, dealers are reluctant to sell.

▪ Export, anticipation, dwindling scrap output, and buying for post-strike delivery: These all figured in higher scrap prices reported by a number of areas this week.

The export market is still very active, and brokers are trying to cover themselves before there is a break in the steel strike. A resumption of domestic steel production would reduce the amount of scrap available for export.

In many areas, the trade is getting bull-market fever. Dealers find it hard to convince themselves that mills won't be operating before very long. Rumors that other steel companies were ready to join Kaiser in bargaining independently with the United Steelworkers strengthened these feelings.

Production Cutbacks — Generation of scrap is falling off sharply in most areas. The auto industry, always a big source of high quality scrap, has indicated it may not be able to deliver all that it offered. Supplier companies have less to offer because of production cutbacks.

Every day that the strike continues means that mills will have that much less time to stockpile ore before the season ends on the Great Lakes.

Pittsburgh — Prices of dealer openhearth grades moved up $1 here on the basis of mill buying for after the strike. On this basis, No. 1 dealer grades are said to be bringing prices ranging from $48 to $50. Major industrial lists for next month are very small and the feeling is mills will have to rely on the dealer market for most immediate needs.

Chicago — The area market marked time after a strong surge the previous week. Anticipation of new factory bundle list prices, plus indications that mills planned to buy in 7 to 10 days, had the effect of freezing the market at existing prices. While strong consumer resistance is evident, dealers continue to reduce the amount of scrap they are willing to sell.

Philadelphia — Export continues as the dominant influence in the market. Increases in scrap prices for export are dragging domestic prices upward sympathetically. The domestic price increase, however, is based more on appraisal than as a reflection of actual sales.

New York—Scrap prices are unchanged here as the trade awaits settlement of the steel strike. Export buying and orders from mills still operating continue to provide a price floor.

Detroit—Higher scrap prices are a definite prospect in coming weeks. There's little industrial scrap around because of lagging auto operations. Some firms aren't even putting scrap on November industrial lists. Others are offering some, but without guarantee of delivery. Chrysler, for one, pulled 400 carloads of No. 1 bundles off its list for a conversion deal.

Cleveland—The price crept up another $1 on dealer grades as a Valley-area electric furnace mill came into the market for dealer bundles and busheling at $48. Tonnage from auto plants for November is indefinite. Low phos punchings and plate in Cleveland were incorrectly quoted Oct. 15 and 22. The correct price should have been $43.50 to $44.50.

St. Louis — Most prices remain unchanged this week, however, some railroad grades are up $1. Everyone seems a little nervous over the steel strike situation. But movement of scrap has picked up.

Cincinnati—This market is up $2 a ton on broker buying and increased prices are still only bringing out small tonnages. An increasing amount of scrap is being sold at current prices for post-strike delivery and payment.

Birmingham—The scrap market is strong with fairly good movement evident. Electric furnace steel is reported to be in especially strong demand — with some consumers paying as much as $2 a ton above quotations for tonnages.

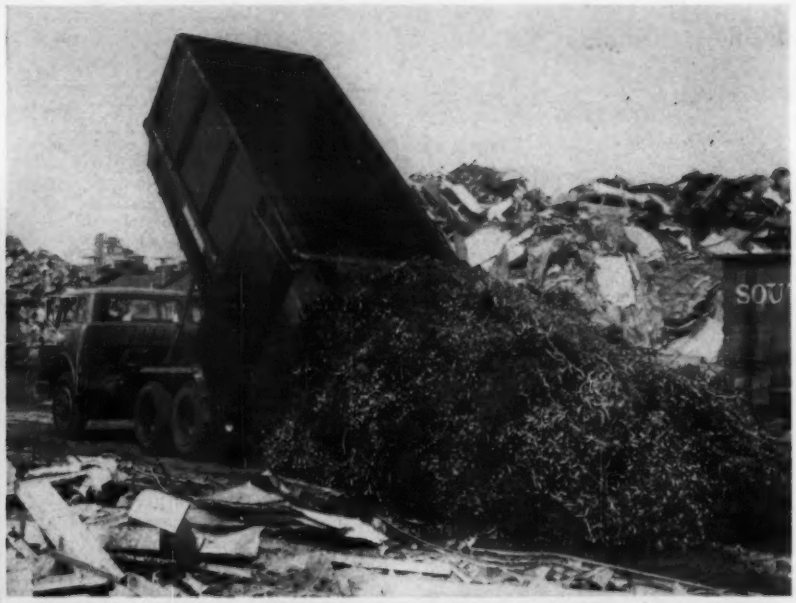
Buffalo—The market continues strong despite a complete lack of activity. A check has disclosed that mills have made no preliminary inquiries on scrap despite other moves which indicate they feel steel production might resume soon.

Boston—In the face of little or no activity, prices remain unchanged this week. The trade is waiting for settlement of the steel strike to set the pace for the market.

West Coast—The market is in the doldrums. Exporters have enough to fill current needs and dealers are worried that new orders won't follow the mill startup immediately.

Houston—Export shipments have resumed with the end of the dock strike. Exporters are quoting prices as much as $6 above domestic prices per ton for melting grades. Domestic market retains its status quo. The intake of scrap seems to be improving.

Tangled turnings, 30 cubic yards of them, slide smoothly out of Huge-Haul container, in one swoop! No obstructions at rear corners of the container to "hang up" the load. And doors open to *full width*.



HUGE-HAUL detachable container system

CUTS SCRAP HANDLING COSTS 30%

Trimmings go into a 30 cubic yard Huge-Haul container stationed at a customer's plant. Lipsett's Huge-Haul truck will pick container up later, in the course of making its rounds.

Clippings cascade cleanly from one of Lipsett's 10 cubic yard Huge-Haul containers. No need to wait for the crane. Huge-Haul is on its way without delay.

for Industrial Scrap Handling Division of Lipsett Steel Products, Inc.

This up-to-the-minute Los Angeles scrap dealer harvests scrap metal in a big way with the up-to-the-minute Huge-Haul system. Serving a large number of industrial plants over a large area, Lipsett offers its customers 10, 20 and 30 cubic yard Huge-Haul containers, thus tailoring the service to the needs of the individual plant.

The "walk-in" feature of the Huge-Haul containers makes them easy to load, saving the customer many manhours. The containers also enable him to make better segregation and realize maximum prices for various grades.

Convenient size of the Huge-Haul containers, 17'4" long, provides a flexibility unattainable with truck-trailers. Rollers under the rear of the container permit it to be moved by the customer, if he desires.

Huge-Haul's advantages, liked by Lipsett's customers, give Lipsett a decided "competitive edge". In addition, Lipsett saves money because the containers require no licenses, tires or insurance. And a single Huge-Haul truck does the work of a fleet of ordinary trucks. Because, with Huge-Haul, the truck doesn't wait for a crane, valuable time is saved in unloading. States a Lipsett executive: "Although our Huge-Haul system has been in operation for only a couple of months, we already see a 30% reduction in our scrap collection and handling costs."

Save, and profit, with the Huge-Haul system—detachable containers in capacities to 40 cubic yards, hoist capacity 30,000 pounds. Write or 'phone for complete information and name of your nearest dealer.

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SCRAP PRICES *(Effective Oct. 27, 1959)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$47.00 to $48.00
No. 2 hvy. melting	37.00 to 38.00
No. 1 dealer bundles	48.00 to 49.00
No. 1 factory bundles	53.00 to 54.00
No. 2 bundles	33.00 to 34.00
No. 1 busheling	47.00 to 48.00
Machine shop turn.	24.00 to 25.00
Shoveling turnings	31.00 to 32.00
Cast iron borings	30.00 to 31.00
Low phos. punch'gs plate	54.00 to 55.00
Heavy turnings	38.00 to 39.00
No. 1 RR hvy. melting	50.00 to 51.00
Scrap rails, random lgth.	59.00 to 60.00
Rails 2 ft and under	64.00 to 65.00
RR specialties	59.00 to 60.00
No. 1 machinery cast.	55.00 to 56.00
Cupola cast.	51.00 to 52.00
Heavy breakable cast.	49.00 to 50.00
Stainless	
18-8 bundles and solids	235.00 to 240.00
18-8 turnings	115.00 to 120.00
430 bundles and solids	130.00 to 135.00
410 turnings	60.00 to 65.00

Chicago

No. 1 hvy. melting	$44.00 to $45.00
No. 2 hvy. melting	41.00 to 42.00
No. 1 dealer bundles	44.00 to 45.00
No. 1 factory bundles	50.00 to 51.00
No. 2 bundles	30.00 to 31.00
No. 1 busheling	44.00 to 45.00
Machine shop turn.	26.00 to 27.00
Mixed bor. and turn.	28.00 to 29.00
Shoveling turnings	28.00 to 29.00
Cast iron borings	28.00 to 29.00
Low phos. forge crops	58.00 to 59.00
Low phos. punch'gs plate, ¼ in. and heavier	55.00 to 56.00
Low phos. 2 ft and under	53.00 to 54.00
No. 1 RR hvy. melting	50.00 to 51.00
Scrap rails, random lgth.	59.00 to 60.00
Rerolling rails	67.00 to 68.00
Rails 2 ft and under	63.00 to 64.00
Angles and splice bars	58.00 to 59.00
RR steel car axles	60.00 to 61.00
RR couplers and knuckles	55.00 to 56.00
No. 1 machinery cast.	64.00 to 65.00
Cupola cast.	57.00 to 58.00
Cast iron wheels	51.00 to 52.00
Malleable	65.00 to 66.00
Stove plate	53.00 to 54.00
Steel car wheels	55.00 to 56.00
Stainless	
18-8 bundles and solids	220.00 to 225.00
18-8 turnings	120.00 to 125.00
430 bundles and solids	120.00 to 125.00
430 turnings	60.00 to 65.00

Philadelphia Area

No. 1 hvy. melting	$46.00 to $47.00
No. 2 hvy. melting	40.00 to 41.00
No. 1 dealer bundles	48.00 to 49.00
No. 2 bundles	30.00 to 31.00
No. 1 busheling	48.00 to 49.00
Machine shop turn.	24.00 to 25.00
Mixed bor. short turn.	23.00 to 24.00
Cast iron borings	22.00 to 23.00
Shoveling turnings	27.00 to 28.00
Clean cast. chem. borings	30.00 to 31.00
Low phos. 5 ft and under	49.00 to 50.00
Low phos. 2 ft punch'gs	51.00 to 52.00
Elec. furnace bundles	49.00 to 50.00
Heavy turnings	34.00 to 35.00
RR specialties	48.00 to 49.00
Rails 18 in. and under	67.00 to 68.00
Cupola cast.	46.00 to 47.00
Heavy breakable cast.	47.00 to 48.00
Cast iron car wheels	48.00 to 49.00
Malleable	67.00 to 68.00
No. 1 machinery cast.	53.00 to 54.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$37.50 to $38.50
No. 2 hvy. melting	32.50 to 33.50
No. 1 dealer bundles	37.50 to 38.50
No. 2 bundles	27.00 to 28.00
Machine shop turn.	19.00 to 20.00
Shoveling turnings	21.00 to 22.00
Cast iron borings	20.00 to 21.00
Low phos. 18 in. and under	49.00 to 50.00
Rails, random length	53.00 to 54.00
Rails, 18 in. and under	61.00 to 62.00
No. 1 cupola cast.	48.00 to 49.00
Hvy. breakable cast.	43.00 to 44.00
Drop broken cast.	58.00 to 59.00

Youngstown

No. 1 hvy. melting	$46.00 to $47.00
No. 2 hvy. melting	39.00 to 40.00
No. 1 dealer bundles	47.00 to 48.00
No. 2 bundles	29.50 to 30.50
Machine shop turn.	21.50 to 22.50
Shoveling turnings	26.50 to 27.50
Low phos. plate	48.00 to 49.00

Cleveland

No. 1 hvy. melting	$42.50 to $43.50
No. 2 hvy. melting	35.50 to 36.50
No. 1 dealer bundles	43.50 to 44.50
No. 1 factory bundles	48.00 to 49.00
No. 2 bundles	26.00 to 27.00
No. 1 busheling	43.50 to 44.50
Machine shop turn.	19.00 to 20.00
Mixed bor. and turn.	24.00 to 25.00
Shoveling turnings	24.00 to 25.00
Cast iron borings	24.00 to 25.00
Cut structural & plates, 2 ft & under	49.00 to 50.00
Drop forge flashings	42.50 to 43.50
Low phos. punch'gs plate	43.50 to 44.50
Foundry steel, 2 ft & under	41.00 to 42.00
No. 1 RR hvy. melting	46.50 to 47.50
Rails 2 ft and under	60.00 to 61.00
Rails 18 in. and under	61.00 to 62.00
Steel axle turnings	24.00 to 25.00
Railroad cast.	58.00 to 59.00
No. 1 machinery cast.	56.00 to 57.00
Stove plate	51.00 to 52.00
Malleable	67.00 to 68.00
Stainless	
18-8 bundles	225.00 to 235.00
18-8 turnings	115.00 to 120.00
430 bundles	120.00 to 125.00

Buffalo

No. 1 hvy. melting	$36.00 to $37.00
No. 2 hvy. melting	29.00 to 30.00
No. 1 busheling	36.00 to 37.00
No. 1 dealer bundles	36.00 to 37.00
No. 2 bundles	25.00 to 26.00
Machine shop turn.	17.00 to 18.00
Mixed bor. and turn.	18.00 to 19.00
Shoveling turnings	21.00 to 22.00
Cast iron borings	18.00 to 19.00
Low phos. plate	41.00 to 42.00
Structurals and plate, 2 ft and under	42.00 to 43.00
Scrap rails, random lgth.	40.00 to 41.00
Rails 2 ft and under	50.00 to 51.00
No. 1 machinery cast.	51.00 to 52.00
No. 1 cupola cast.	47.00 to 48.00

St. Louis

No. 1 hvy. melting	$40.00 to $41.00
No. 2 hvy. melting	37.00 to 38.00
No. 1 dealer bundles	45.00 to 46.00
No. 2 bundles	28.00 to 29.00
Machine shop turn.	21.00 to 22.00
Shoveling turnings	23.00 to 24.00
Cast iron borings	24.00 to 25.00
No. 1 RR hvy. melting	49.00 to 50.00
Rails, random lengths	53.00 to 54.00
Rails, 18 in. and under	58.00 to 59.00
Angles and splice bars	50.00 to 51.00
RR specialties	51.00 to 52.00
Cupola cast.	55.00 to 56.00
Heavy breakable cast.	44.00 to 45.00
Stove plate	46.00 to 47.00
Cast iron car wheels	48.50 to 49.50
Rerolling rails	65.00 to 66.00
Unstripped motor blocks	45.00 to 46.00

Birmingham

No. 1 hvy. melting	$35.00 to $36.00
No. 2 hvy. melting	30.00 to 31.00
No. 1 dealer bundles	35.00 to 36.00
No. 1 special bundles	38.00 to 39.00
No. 2 bundles	24.00 to 25.00
No. 1 busheling	41.00 to 42.00
Machine shop turn.	24.00 to 25.00
Shoveling turnings	27.00 to 28.00
Cast iron borings	14.00 to 15.00
Electric furnace bundles	40.00 to 41.00
Elec. furnace, 3 ft & under	38.00 to 39.00
Bar crops and plate	46.00 to 47.00
Structural and plate, 2 ft.	45.00 to 46.00
No. 1 RR hvy. melting	39.00 to 40.00
Scrap rails, random lgth.	49.00 to 50.00
Rails, 18 in. and under	54.00 to 55.00
Angles and splice bars	46.00 to 47.00
Rerolling rails	63.00 to 64.00
No. 1 cupola cast.	53.00 to 54.00
Stove plate	53.00 to 54.00
Cast iron car wheels	43.00 to 44.00
Unstripped motor blocks	41.00 to 42.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$35.00 to $36.00
No. 2 hvy. melting	31.00 to 32.00
No. 2 dealer bundles	22.00 to 23.00
Machine shop turnings	10.00 to 11.00
Mixed bor. and turn.	12.00 to 13.00
Shoveling turnings	15.00 to 16.00
Clean cast. chem. borings	25.00 to 26.00
No. 1 machinery cast.	39.00 to 40.00
Mixed yard cast.	37.00 to 38.00
Heavy breakable cast.	37.00 to 38.00
Stainless	
18-8 prepared solids	195.00 to 200.00
18-8 turnings	85.00 to 90.00
430 prepared solids	85.00 to 90.00
430 turnings	20.00 to 25.00

Detroit

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$38.00 to $39.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 dealer bundles	40.00 to 41.00
No. 2 bundles	22.00 to 23.00
No. 1 busheling	37.00 to 38.00
Drop forge flashings	38.00 to 39.00
Machine shop turn.	18.00 to 19.00
Mixed bor. and turn.	19.00 to 20.00
Shoveling turnings	19.00 to 20.00
Cast iron borings	21.00 to 22.00
Heavy breakable cast.	41.00 to 42.00
Mixed cupola cast.	49.00 to 50.00
Automotive cast.	55.00 to 56.00
Stainless	
18-8 bundles and solids	195.00 to 200.00
18-8 turnings	75.00 to 85.00
430 bundles and solids	90.00 to 95.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$32.00 to $33.00
No. 2 hvy. melting	25.00 to 26.00
No. 1 dealer bundles	34.00 to 35.00
No. 2 bundles	17.00 to 18.00
No. 1 busheling	34.00 to 35.00
Machine shop turn.	12.00 to 13.00
Shoveling turnings	14.00 to 15.00
Clean cast. chem. borings	18.50 to 19.50
No. 1 machinery cast.	40.00 to 41.00
Mixed cupola cast.	37.00 to 38.00
Heavy breakable cast.	34.00 to 35.00

San Francisco

No. 1 hvy. melting		$36.00
No. 2 hvy. melting		33.00
No. 1 dealer bundles		33.00
No. 2 bundles		22.00
Machine shop turn.		17.00
Cast iron borings		17.00
No. 1 cupola cast.		47.00

Los Angeles

No. 1 hvy. melting		$38.00
No. 2 hvy. melting		36.00
No. 1 dealer bundles		33.00
No. 2 bundles		20.00
Machine shop turn.		16.00
Shoveling turnings		18.00
Cast iron borings		18.00
Elec. furn. 1 ft and under (foundry)	$47.00 to	48.00
No. 1 cupola cast.		47.00

Seattle

No. 1 hvy. melting		$35.00
No. 2 hvy. melting		33.00
No. 2 bundles		22.00
No. 1 cupola cast.		36.00
Mixed yard cast.		36.00

Hamilton, Ont.

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting		$32.25
No. 2 hvy. melting		28.25
No. 1 dealer bundles		32.25
No. 2 bundles		22.75
Mixed steel scrap		24.25
Bush., new fact., prep'd.		32.25
Bush., new fact., unprep'd		26.25
Machine shop turn.		14.00
Short steel turn.		17.00
Mixed bor. and turn.		13.00
Rails, rerolling		37.00
Cast scrap	$46.50 to	48.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting		$34.00
No. 2 hvy. melting		31.00
No. 2 bundles		20.00
Machine shop turn.		16.00
Shoveling turnings		20.00
Cut structural plate 2 ft & under	$47.50 to	48.50
Unstripped motor blocks	39.50 to	40.50
Cupola cast.	46.00 to	47.00
Heavy breakable cast.	34.00 to	35.00

METALS ENGINEER AT WORK
R: Don Nulk, Senior Project Engineer, in charge of Design Metallurgy, Tapco Group
—Thompson Ramo Wooldridge, Inc

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Let's not emphasize the size of the $140 billion metalworking market. Rather, let's think about *your* product. Let's remember that its inherent purpose — *its engineering advantages and applications* — is most often its basic appeal to metalworking. So isn't it obvious that technical management (technology) must pass upon these engineering features somewhere early in the buying process?

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Is Aluminum Labor Pact Near?

Kaiser Aluminum is expected to settle with USW soon after Kaiser Steel.

Others are non-committal, but a Kaiser agreement would create strong pressures.

▪ When Kaiser Steel settles with the United Steelworkers of America, will Kaiser Aluminum be far behind?

Kaiser Aluminum & Chemical Corp. is expected to take its cue from its steel brother quickly. All the factors point this way.

Keep in Touch—For one thing, liaison between the two Kaiser negotiating teams has been close. And obviously, with Kaiser interests deeply involved in the two negotiations, a move in one could not be made without considering the impact on the other.

Kaiser people haven't said that a settlement by its steelmaker would set the pattern for an offer to the USW by the aluminum company. But, on an industry-wide basis, steel has always set the pattern. And a Kaiser spokesman has said the key issue in aluminum is purely economic.

What About the Other — The next question is, "Will the other major aluminum producers follow Kaiser?"

Officially, both Aluminum Co. of America and Reynolds Metals Co. will wait and see. But the tone of their comments suggests they believe Kaiser Aluminum will sign a new contract soon.

"We'll have to see what Kaiser settles for before we decide what to do," said a representative of one company.

"We can't say anything yet," another source reports. "Of course, you must bear in mind that while Kaiser is only two pct of the steel industry, it is 26 pct of the aluminum industry."

Under the current extension agreement in the aluminum industry, all it takes for the union to strike, after Nov. 1, is 10 days notice.

Price Problems—Also, any settlement is retroactive to August 1. That means the producers have a higher cost on the metal they've been making and selling since then, and they don't know how much. They'd like to get their economic house in order so they can re-examine their current price structure.

For those who like to speculate: Kennecott Copper Co. owns a big enough block of Kaiser Aluminum to make its voice head on a prospective settlement. And Kennecott also deals with Steelworkers at its Garfield, U., installation.

Copper

Brass mills are feeling the steel much more than the copper strike.

Said the head of one major mill: "We have to pay a premium, but we can still get enough copper. The trouble is that some of our best customers have cut their buying sharply."

Another top mill executive also concedes business has fallen off lately, because customers who use brass and copper in conjunction with steel in their product are all but off the market.

But he looks for brass mill business to really skyrocket as soon as the steel strike is settled.

Will the brass mills be able to keep up with the sharp increase in demand?

Most of them think so. Right now many mills are stocking up on semi-finished shapes. They say it will take two weeks to 30 days for the expected buying rush to hit them, which gives them enough slack.

Aluminum Scrap

The Aluminum Smelters Research Institute request that export of aluminum scrap be curtailed has been rejected by Carl F. Oechsle, Asst. Secretary of Commerce.

Carl Burton, Institute secretary, says the because Mr. Oechsle's reply dealt only with an unusual situation that developed in July, and "in no way altered the facts brought out in the original brief," he is asking that the case be reopened.

Tin prices for the week: Oct. 21—101.625; Oct. 22 — 101.625; Oct. 23 — 101.75; Oct. 26—101.625; Oct. 27—101.75.*

*Estimate.

Primary Prices

(cents per lb)	current price	last price	date of change
Aluminum pig	24.70	24.00	8/1/58
Aluminum ingot	26.80	26.10	8/1/58
Copper (E)	30-31.50	30.00	9/9/59
Copper (CS)	33.00	30.00	8/1/59
Copper (L)	31.50	30.00	9/9/59
Lead, St. L.	12.80	11.80	8/24/59
Lead, N. Y.	13.00	12.00	8/24/59
Magnesium ingot	36.00	34.50	8/13/58
Magnesium pig	35.25	33.75	8/13/58
Nickel	74.00	64.50	12/6/58
Titanium sponge	150-160	162-182	8/1/59
Zinc, E. St. L.	12.5-13	12.00	10/23/59
Zinc, N. Y.	13-13.5	12.50	10/23/59

ALUMINUM: 99% Ingot COPPER: (E) = electrolytic, (CS) = custom smelters, electrolytic. (L) = lake. LEAD: common grade. MAGNESIUM: 99.8% pig Velasco, Tex. NICKEL: Port Colborne, Canada. ZINC: prime western. TIN: See above; Other primary prices, pg. 163.

NONFERROUS PRICES

MILL PRODUCTS

(Cents per lb unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. customer's plant)

Flat Sheet (Mill Finish and Plate)

("F" temper except 6061-0)

Alloy	.032	.081	.136 .249	.250- 3.
1100, 3003	45.7	43.8	42.8	43.3
5052	53.1	48.4	46.9	46.0
6061-0	50.1	45.7	43.9	44.9

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
6- 8	42.7-44.2	51.1-54.8
12-14	42.7-44.2	52.0-56.5
24-26	43.2-44.7	62.8-67.5
36-38	46.7-49.2	86.9-90.5

Screw Machine Stock—2011-T-3

Size*	¼	⅜-½	⅝-1	1¼-1½
Price	62.0	61.2	59.7	57.3

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.019 gage	$1.411	$1.884	$2.353	$2.823
.024 gage	1.762	2.349	2.937	3.524

MAGNESIUM

(F.o.b. shipping pt., carload frt. allowed)

Sheet and Plate

Type↓ Gage→	.250 3.00	.250- 2.00	.188	.081	.032
AZ31B Stand. Grade	.....	67.9	69.0	77.9	103.1
AZ31B Spec.	.....	93.3	95.7	106.7	171.3
Tread Plate	.....	70.6	71.7	.....	.....
Tooling Plate	73.0	.....	.....	.....	.....

Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade. (AZ31C)	65.3	65.3	66.1	71.5
Spec. Grade... (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting)..... 37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	138	120	138
Strip, CR	124	108	138
Rod, bar, HR	107	89	109
Angles, HR	107	89	109
Plates, HR	130	110	126
Seamless tube	157	125	200
Shot, blocks	...	87	...

COPPER, BRASS, BRONZE

(Freight included in 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	54.63	.....	53.86	55.82
Brass, Yellow	48.65	49.19	48.59	52.06
Brass, Low	51.48	52.02	51.42	54.79
Brass, R L	52.48	53.02	52.42	55.79
Brass, Naval	53.29	.....	47.10	56.70
Munts Metal	51.35	.....	46.66	.....
Comm. Bs.	53.92	54.46	53.86	56.98
Mang. Bs.	56.62	.....	50.28	.....
Phos. Bs. 5%	75.34	.....	75.84	.....

Free Cutting Brass Rod..... 33.86

TITANIUM

(Base prices, f.o.b. mill)

Sheet and strip, commercially pure, $7.25-$8.50; alloy, $13.40-$17.00. Plate, HR, commercially pure, $5.25-$6.00; alloy, $8.00-$10.00. Wire, rolled and/or drawn, commercially pure, $5.75-$6.25; alloy, $7.75-$10.00; Bar, HR or forged, commercially pure, $4.25-$5.00; alloy, $4.25-$7.50; billets, HR, commercially pure, $3.55-$4.10; alloy, $3.55-$5.75.

PRIMARY METAL

(Cents per lb unless otherwise noted)

Antimony, American, Laredo, Tex.. 29.50
Beryllium Aluminum 5% Be, Dollar per lb contained Be $74.75
Beryllium copper, per lb conta'd Be. $43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading $71.50
Bismuth, ton lots .....$ 2.25
Cadmium, del'd .....$ 1.40
Calcium, 99.9% small lots .....$ 4.55
Chromium, 99.8% metallic base....$ 1.31
Cobalt, 97-99% (per lb)....$1.75 to $1.82
Germanium, per gm, f.o.b. Miami, Okla., refined .....33.30 to 42.00
Gold, U. S. Treas., per troy oz.....$35.00
Indium, 99.9%, dollars per troy oz..$ 2.25
Iridium, dollars per troy oz.....$75 to $85
Lithium, 98% .....$11.00 to $14.00
Magnesium sticks, 100 to 500 lb.... 59.00
Mercury, dollars per 76-lb flask f.o.b. New York .....$225 to $227
Nickel oxide sinter at Buffalo, N. Y., or other U. S. points of entry, contained nickel 69.60
Palladium, dollars per troy oz...$18 to $20
Platinum, dollars per troy oz...$77 to $80
Rhodium .....$120.00 to $125.00
Silver ingots (¢ per troy oz.).....91.375
Thorium, per kg. $43.00
Vanadium .....$ 3.45
Zirconium sponge .....$ 5.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot
- No. 115 ..... 29.25
- No. 120 ..... 28.00
- No. 123 ..... 27.00

80-10-10 ingot
- No. 305 ..... 33.50
- No. 315 ..... 31.50

88-10-2 ingot
- No. 210 ..... 42.00
- No. 215 ..... 37.75
- No. 245 ..... 33.50

Yellow ingot
- No. 405 ..... 23.75

Manganese bronze
- No. 421 ..... 26.75

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys
- 0.30 copper max. 25.00-25.25
- 0.60 copper max. 24.75-25.00

Piston alloys (No. 132 type)..26.75-27.75
No. 12 alum. (No. 2 grade)...23.50-24.00
108 alloy 24.00-24.50
195 alloy 26.50-27.50
13 alloy (0.60 copper max.)...24.75-25.00
AXS-679 (1 pct zinc) 23.75-24.75

Steel deoxidizing aluminum notch bar granulated or shot

Grade 1—95-97½% 24.00-25.00
Grade 2—92-95% 22.75-23.75
Grade 3—90-92% 21.75-22.75
Grade 4—85-90% 21.25-22.25

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	27½	26¾
Yellow brass	21	18⅞
Red brass	24⅝	23⅝
Comm. bronze	25¼	24½
Mang. bronze	19¾	18⅞
Free cutting rod ends.	20⅛	

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	29½
No. 2 copper wire	26
Light copper	23¾
*Refinery brass	25½
Copper bearing material	24½

*Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	29½
No. 2 copper wire	26
Light copper	23½
No. 1 composition	22½
No. 1 comp. turnings	22
Hvy. yellow brass solids	16
Brass pipe	15½
Radiators	17½
Aluminum	
Mixed old cast.	14 —15
Mixed new clips	16½—17
Mixed turnings, dry	14½—15½

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Copper and Brass

No. 1 copper wire	25½—26
No. 2 copper wire	23¼—23½
Light copper	21¼—21½
Auto radiators (unsweated)	14½—15
No. 1 composition	19 —19½
No. 1 composition turnings	17½—18
Cocks and faucets	14¾—15¼
Clean heavy yellow brass	13¼—13¾
Brass pipe	14¾—15¼
New soft brass clippings	15¼—15¾
No. 1 brass rod turnings	12½—13

Aluminum

Alum. pistons and struts	7½— 8
Aluminum crankcase	11¼—11¾
1100 (2s) aluminum clippings	15 —15½
Old sheet and utensils	11¼—11¾
Borings and turnings	7 — 7½
Industrial castings	11¼—11¾
2020 (24S) clippings	12½—13

Zinc

New zinc clippings	6 — 6½
Old zinc	4 — 4½
Zinc routings	2¾— 3
Old die cast scrap	2¼— 2½

Nickel and Monel

Pure nickel clippings	52-54
Clean nickel turnings	40
Nickel anodes	52-54
Nickel rod ends	52-54
New Monel clippings	30-32
Clean Monel turnings	20-23
Old sheet Monel	26-28
Nickel silver clippings, mixed	18
Nickel silver turnings, mixed	15

Lead

Soft scrap lead	8¾— 9¼
Battery plates (dry)	4½— 4½
Batteries, acid free	2½— 2¾

Miscellaneous

Block tin	77 —78
No. 1 pewter	59 —60
Auto babbitt	40 —41
Mixed common babbitt	9¾—10¼
Solder joints	14 —14½
Siphon tops	42
Small foundry type	10¼—10¾
Monotype	10¼—10¾
Lino. and stereotype	9¼— 9¾
Electrotype	7¾— 8¼
Hand picked type shells	6 — 6½
Lino. and stereo. dross	2¾— 3¼
Electro dross	2¾— 3¼

(Effective Oct. 26, 1959)

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PILING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$119.00 *B3*		5.55 *B3*	8.10 *B3*	5.55 *B5*						
	Buffalo, N. Y.	$80.00 *R3, B3*	$99.50 *R3, B3*	$119.00 *R3, B3*	6.50 *B3*	5.55 *B3*	8.10 *B3*	5.55 *B3*	5.10 *B3, R3*	7.425 *S10, R7*	7.575 *B3*			
	Phila., Pa.									7.875 *P15*				
	Harrison, N. J.													15.55 *C11*
	Conshohocken, Pa.		$104.50 *A2*	$126.00 *A2*					5.15 *A2*		7.575 *A2*			
	New Bedford, Mass.									7.875 *R6*				
	Johnstown, Pa.	$80.00 *B3*	$99.50 *B3*	$119.00 *B3*		5.55 *B3*	8.10 *B3*							
	Boston, Mass.									7.975 *T8*				
	New Haven, Conn.									7.875 *D1*				
	Baltimore, Md.									7.425 *T8*				15.90 *T8*
	Phoenixville, Pa.					5.55 *P2*		5.55 *P2*						
	Sparrows Pt., Md.								5.10 *B3*		7.575 *B3*			
	New Britain, Bridgeport, Wallingford, Conn.			$119.00 *N8*						7.875 *W1,S7*				
	Pawtucket, R. I. Worcester, Mass.									7.975 *N7, A5*				15.90 *N7* 15.70 *T8*
MIDDLE WEST	Alton, Ill.								5.30 *L1*					
	Ashland, Ky.								5.10 *A7*		7.575 *A7*			
	Canton-Massillon, Dover, Ohio		$102.00 *R3*	$119.00 *R3,* $114.00 *T5*						7.425 *G4*		10.80 *G4*		
	Chicago, Franklin Park, Evanston, Ill.	$80.00 *U1, R3*	$99.50 *U1, R3,W8*	$119.00 *U1, R3,W8*	6.50 *U1*	5.50 *U1, W8,P13*	8.05 *U1, Y1,W8*	5.50 *U1*	5.10 *W8, N4,A1*	7.525 *A1,T8, M8*	7.575 *W8*		8.40 *W8, S9,I3*	15.55 *A1, S9,G4,T8*
	Cleveland, Ohio									7.425 *A5,J3*		10.75 *A5*	8.40 *J3*	
	Detroit, Mich.			$119.00 *R5*					5.10 *G3, M2*	7.425 *M2, S1, D1,P11*	7.575 *G3*	10.80 *S1*		
	Anderson, Ind.									7.425 *C4*				
	Gary, Ind. Harbor, Indiana	$80.00 *U1*	$99.50 *U1*	$119.00 *U1, Y1*		5.50 *U1, I3*	8.05 *U1, J3*	5.50 *I3*	5.10 *U1, I3,Y1*	7.425 *Y1*	7.575 *U1, I3,Y1*	10.90 *Y1*	8.40 *U1, Y1*	
	Sterling, Ill.	$80.00 *N4*				5.50 *N4*	7.75 *N4*	5.50 *N4*	5.20 *N4*					
	Indianapolis, Ind.									7.575 *R5*				15.70 *R5*
	Newport, Ky.								5.10 *A9*				8.40 *A9*	
	Niles, Warren, Ohio Sharon, Pa.		$99.50 *Sl2 C10*	$119.00 *C10,S1*					5.10 *R3, S1*	7.425 *R3, T4,S1*	7.575 *R3, S1*	10.80 *R3, S1*	8.40 *S1*	15.55 *S1*
	Owensboro, Ky.	$80.00 *G5*	$99.50 *G5*	$119.00 *G5*										
	Pittsburgh, Midland, Butler, Aliquippa, McKeesport, Pa.	$80.00 *U1, P6*	$99.50 *U1, C11,P6*	$119.00 *U1, C11,B7*	6.50 *U1*	5.50 *U1, J3*	8.05 *U1, J3*	5.50 *U1*	5.10 *P6*	7.425 *J3,B4* 7.525 *E3*			8.40 *S9*	15.55 *S9*
	Weirton, Wheeling, Follansbee, W. Va.				6.50 *U1, W3*	5.50 *W3*		5.50 *W3*	5.10 *W3*	7.425 *W5*	7.575 *W3*	10.80 *W3*		
	Youngstown, Ohio	$80.00 *R3*	$99.50 *Y1, C10*	$119.00 *Y1*			8.05 *Y1*		5.10 *U*	7.425 *Y1,R5*	7.575 *U1, Y1*	10.95 *Y1*	8.40 *U1, Y1*	15.55 *R5, Y1*
WEST	Fontana, Cal.	$90.50 *K1*	$109.00 *K1*	$140.00 *K1*		6.30 *K1*	8.85 *K1*	6.45 *K1*	5.825 *K1*	9.20 *K1*				
	Geneva, Utah		$99.50 *C7*			5.50 *C7*	8.05 *C7*							
	Kansas City, Mo.					5.60 *S2*	8.15 *S2*						8.65 *S2*	
	Los Angeles, Torrance, Cal.		$109.00 *B2*	$139.00 *B2*		6.20 *C7, B2*	8.75 *B2*		5.85 *C7, B2*	9.30 *C1,R5*			9.60 *B2*	17.75 *J3*
	Minnequa, Colo.					5.80 *C6*			6.20 *C6*	9.375 *C6*				
	Portland, Ore.					6.25 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$109.00 *B2*			6.15 *B2*	8.70 *B2*		5.85 *C7, B2*					
	Seattle, Wash.		$109.00 *B2*			6.25 *B2*	8.80 *B2*		6.10 *B2*					
SOUTH	Atlanta, Ga.					5.70 *A8*			5.10 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$80.00 *T2*	$99.50 *T2*			5.50 *T2 R3,C16*	8.05 *T2*		5.10 *T2, R3,C16*		7.575 *T2*			
	Houston, Lone Star, Texas		$104.50 *S2*	$124.00 *S2*		5.60 *S2*	8.15 *S2*						8.65 *S2*	

(Effective Oct. 26, 1959)

IRON AGE

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS								WIRE ROD	TINPLATE†		
		Hot-rolled *18* ga. & hvyr.	Cold-rolled	Galvanized (Hot-dipped)	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.		Cokes* *1.25*-lb. base box	Electro** *0.25*-lb. base box	Holloware Enameling *29* ga.
EAST	Buffalo, N. Y.	5.10 *B3*	6.275 *B3*				7.525 *B3*	9.275 *B3*		6.40 *W6*	† Special coated mfg. terne deduct 35¢ from 1.25-lb. coke base box price, 0.75 lb./0.25 lb. add 55¢. Can-making quality BLACKPLATE 55 to 128 lb. deduct $2.20 from 1.25 lb. coke base box. * COKES: 1.50-lb. add 25¢. **ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb./0.25 lb. add 65¢.		
	Claymont, Del.												
	Coatesville, Pa.												
	Conshohocken, Pa.	5.15 *A2*	6.325 *A2*				7.575 *A2*						
	Harrisburg, Pa.												
	Hartford, Conn.												
	Johnstown, Pa.									6.40 *B3*			
	Fairless, Pa.	5.15 *U1*	6.325 *U1*				7.575 *U1*	9.325 *U1*			$10.50 *U1*	$9.20 *U1*	
	New Haven, Conn.												
	Phoenixville, Pa.												
	Sparrows Pt., Md.	5.10 *B3*	6.275 *B3*	6.875 *B3*			7.525 *B3*	9.275 *B3*	10.825 *B3*	6.50 *B3*	$10.40 *B3*	$9.10 *B3*	
	Worcester, Mass.									6.70 *A5*			
	Trenton, N. J.												
MIDDLE WEST	Alton, Ill.									6.60 *L1*			
	Ashland, Ky.	5.10 *A7*		6.875 *A7*	6.775 *A7*		7.525 *A7*						
	Canton-Massillon, Dover, Ohio			6.875 *R1, R3*									
	Chicago, Joliet, Ill.	5.10 *W8, A1*					7.525 *U1, W8*			6.40 *A5, R3,W8*			
	Sterling, Ill.									6.50 *N4, K2*			
	Cleveland, Ohio	5.10 *R3, J3*	6.275 *R3, J3*	7.65 *R3**	6.775 *R3*		7.525 *R3, J3*	9.275 *R3, J3*		6.40 *A5*			
	Detroit, Mich.	5.10 *G3, M2*	6.275 *G3, M2*				7.525 *G3*	9.275 *G3*					
	Newport, Ky.	5.10 *A9*	6.275 *A9*										
	Gary, Ind. Harbor, Indiana	5.10 *U1, I3,Y1*	6.275 *U1, I3,Y1*	6.875 *U1, I3*	6.775 *U1, I3,Y1*	7.225 *U1*	7.525 *U1, Y1,I3*	9.275 *U1, Y1*		6.40 *Y1*	$10.40 *U1, Y1*	$9.10 *I3, U1,Y1*	7.35 *U1, Y1*
	Granite City, Ill.	5.20 *G2*	6.375 *G2*	6.975 *G2*								$9.20 *G2*	7.95 *G2*
	Kokomo, Ind.			6.975 *C9*						6.50 *C9*			
	Mansfield, Ohio	5.10 *E2*	6.275 *E2*			7.225 *E2*							
	Middletown, Ohio		6.275 *A7*	6.875 *A7*	6.775 *A7*	7.225 *A7*							
	Niles, Warren, Ohio Sharon, Pa.	5.10 *R3, S1*	6.275 *R3*	6.875 *R3* 7.65 *R3**	6.775 *S1*	7.225 *S1**, *R3*	7.525 *R3, S1*	9.275 *R3,*				$9.10 *R3*	
	Pittsburgh, Midland, Butler, Dunora, Aliquippa, McKeesport, Pa.	5.10 *U1, J3,P6*	6.275 *U1, J3,P6*	6.875 *U1, J3* 7.50 *E3**	6.775 *U1*		7.525 *U1, J3*	9.275 *U1, J3*	10.825 *U1, J3*	6.40 *A5, J3,P6*	$10.40 *U1, J3*	$9.10 *U1, J3*	7.85 *U1, J3*
	Portsmouth, Ohio	5.10 *P7*	6.275 *P7*							6.40 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	5.10 *W3, W5*	6.275 *W3, F3,W5*	6.875 *W3, W5* 7.50 *W3**		7.225 *W3, W5*	7.525 *W3*	9.275 *W3*			$10.40 *W5, W3*	$9.10 *W5, W3*	7.85 *W5*
	Youngstown, Ohio	5.10 *U1, Y1*	6.275 *Y1*	7.50 *J3**	6.775 *Y1*		7.525 *Y1*	9.275 *Y1*		6.40 *Y1*			
WEST	Fontana, Cal.	5.825 *K1*	7.40 *K1*				8.25 *K1*	10.40 *K1*			$11.05 *K1*	$9.75 *K1*	
	Geneva, Utah	5.20 *C7*											
	Kansas City, Mo.									6.65 *S2*			
	Los Angeles, Torrance, Cal.									7.20 *B2*			
	Minnequa, Colo.									6.65 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.80 *C7*	7.225 *C7*	7.625 *C7*						7.20 *C7*	$11.05 *C7*	$9.75 *C7*	
SOUTH	Atlanta, Ga.												
	Fairfield, Ala. Alabama City, Ala.	5.10 *T2, R3*	6.275 *T2, R3*	6.875 *T2, R3*	6.775 *T2*					6.40 *T2,R3*	$10.50 *T2*	$9.20 *T2*	
	Houston, Texas									6.65 *S2*			

*Electrogalvanized sheets.

(Effective Oct. 26, 1959)

*7.425 at Sharon-Niles is 7.225

IRON AGE

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon† Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.				6.725 *B3*	9.025 *B3*	8.30 *B3*					
	Buffalo, N. Y.	5.675 *R3,B3*	5.675 *R3,B3*	7.70 *B5*	6.725 *B3,R3*	9.025 *B3,B5*	8.30 *B3*	5.30 *B3*				8.00 *W6*
	Claymont, Del.							5.30 *C4*		7.50 *C4*	7.95 *C4*	
	Coatesville, Pa.							5.30 *L4*		7.50 *L4*	7.95 *L4*	
	Conshohocken, Pa.							5.30 *A2*	6.375 *A2*	7.50 *A2*	7.95 *A2*	
	Harrisburg, Pa.							5.30 *P2*	6.375 *P2*			
	Milton, Pa.	5.825 *M7*	5.825 *M7*									
	Hartford, Conn.			8.15 *R3*		9.325 *R3*						
	Johnstown, Pa.	5.675 *B3*	5.675 *B3*		6.725 *B3*		8.30 *B3*	5.30 *B3*		7.50 *B3*	7.95 *B3*	8.00 *B3*
	Fairless, Pa.	5.825 *U1*	5.825 *U1*		6.875 *U1*							
	Newark, Camden, N. J.			8.10 *W10, P10*		9.20 *W10, P10*						
	Bridgeport, Putnam, Willimantic, Conn.			8.20 *W10* 8.15 *J3*	6.80 *N8*	9.175 *N8*						
	Sparrows Pt., Md.		5.675 *B3*					5.30 *B3*		7.50 *B3*	7.95 *B3*	8.10 *B3*
	Palmer, Worcester, Readville, Mansfield, Mass.			8.20 *B5, C14*		9.325 *A5,B5*						8.30 *A5, W6*
	Spring City, Pa.			8.10 *K4*		9.20 *K4*						
MIDDLE WEST	Alton, Ill.	5.875 *L1*										8.20 *L1*
	Ashland, Newport, Ky.							5.30 *A7,A9*		7.50 *A9*	7.95 *A7*	
	Canton, Massillon, Mansfield, Ohio	6.15* *R3*		7.65 *R3,R2*	6.725 *R3* 6.475 *T5*	9.025 *R3,R2* 8.775 *T5*		5.30 *E2*				
	Chicago, Joliet, Waukegan, Madison, Harvey, Ill.	5.675 *U1,R3, W8,N4,P13*	5.675 *U1,R3, N4,P13,W8* 5.875 *L1*	7.65 *A5, W10,W8, B5,L2,N9*	6.725 *U1,R3, W8*	9.025 *A5, W10,W8, L2,N8,B5*	8.30 *U1,W8, R3*	5.30 *U1,A1, W8,I3*	6.375 *U1*	7.50 *U1, W8*	7.95 *U1, W8*	8.00 *A5,*[illegible]*3, W8,N4, K2,W1*
	Cleveland, Elyria, Ohio	5.675 *R3*	5.675 *R3*	7.65 *A5,C13, C18*		9.025 *A5, C13,C18*	8.30 *R3*	5.30 *R3,J3*	6.375 *J3*		7.95 *R3,J3*	8.00 *A5, C13,C1*[illegible]
	Detroit, Mich.	5.675 *G3*	5.675 *G3*	7.90 *P3* 7.85 *P8,B5* 7.65 *R5*	6.725 *R5,G3*	9.025 *R5* 9.225 *B5,P3, P8*	8.30 *G3*	5.30 *G3*		7.50 *G3*	7.95 *G3*	
	Duluth, Minn.											8.00 *A5*
	Gary, Ind. Harbor, Crawfordsville, Hammond, Ind.	5.675 *U1,I3, Y1*	5.675 *U1,I3, Y1*	7.65 *R3,J3*	6.725 *U1,I3, Y1*	9.025 *R3,M4*	8.30 *U1,Y1*	5.30 *U1,I3, Y1*	6.375 *J3, I1*	7.50 *U1, Y1*	7.95 *U1, Y1,I3*	8.10 *M4*
	Granite City, Ill.							5.40 *G2*				
	Kokomo, Ind.		5.775 *C9*									8.10 *C9*
	Sterling, Ill.	5.775 *N4*	5.775 *N4*					5.30 *N4*				8.10 *K2*
	Niles, Warren, Ohio Sharon, Pa.			7.65 *C10*	6.725 *C10,*	9.025 *C10*		5.30 *R3,S1*		7.50 *S1*	7.95 *R3, S1*	
	Owensboro, Ky.	5.675 *G5*			6.725 *G5*							
	Pittsburgh, Midland, Donora, Aliquippa, Pa.	5.675 *U1,J3*	5.675 *U1,J3*	7.65 *A5,B4, R3,J3,C11, W10,S9,C8, M9*	6.725 *U1,J3, C11,B7*	9.025 *A5, W10,R3,S9, C11,C8,M9*	8.30 *U1,J3*	5.30 *U1,J3*	6.375 *U1,J3*	7.50 *U1, J3,B7*	7.95 *U1, J3,B7*	8.00 *A5, J3,P6*
	Portsmouth, Ohio											8.00 *P7*
	Weirton, Wheeling, Follansbee, W. Va.							5.30 *W3*				
	Youngstown, Ohio	5.675 *U1,R3, Y1*	5.675 *U1,R3, Y1*	7.65 *A1,Y1, F2*	6.725 *U1,Y1*	9.025 *Y1,F2*	8.30 *U1,Y1*	5.30 *U1, R3,Y1*		7.50 *Y1*	7.95 *U1,Y1*	8.00 *Y1*
WEST	Emeryville, Fontana, Cal.	6.425 *J5* 6.375 *K1*	6.425 *J5* 6.375 *K1*		7.775 *K1*		9.00 *K1*	6.10 *K1*		8.30 *K1*	8.75 *K1*	
	Geneva, Utah							5.30 *C7*			7.95 *C7*	
	Kansas City, Mo.	5.925 *S2*	5.925 *S2*		6.975 *S2*		8.55 *S2*					8.25 *S2*
	Los Angeles, Torrance, Cal.	6.375 *C7,B2*	6.375 *C7,B2*	9.10 *R3,P14, S12*	7.775 *B2*	11.00 *P14, S12*	8.625 *B2*					8.95 *B2*
	Minnequa, Colo.	6.125 *C6*	6.125 *C6*					6.15 *C6*				8.35 *C6*
	Portland, Ore.	6.425 *O2*	6.425 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	6.375 *C7* 6.425 *B2*	6.375 *C7* 6.425 *B2*				8.675 *B2*					8.95 *C7,C6*
	Seattle, Wash.	6.425 *B2,N6, A10*	6.425 *B2,A10*				8.675 *B2*	6.20 *B2*		8.40 *B2*	8.85 *B2*	
SOUTH	Atlanta, Ga.	5.875 *A8*	5.675 *A8*									8.00 *A8*
	Fairfield City, Ala. Birmingham, Ala.	5.675 *T2,R3, C16*	5.675 *T2,R3, C16*	8.25 *C16*			8.30 *T2*	5.30 *T2,R3*			7.95 *T2*	8.00 *T2,R3*
	Houston, Ft. Worth, Lone Star, Texas	5.925 *S2*	5.925 *S2*		6.975 *S2*		8.55 *S2*	5.40 *S2*		7.60 *S2*	8.05 *S2*	8.25 *S2*

† Merchant Quality—Special Quality 35¢ higher. (Effective Oct. 26, 1959) * Special Quality.

STEEL PRICES

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angel Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A9 Acme-Newport Steel Co., Newport, Ky.
A10 Alaska Steel Mills, Inc., Seattle, Wash.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Steel Co., Pacific Coast Div.
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brook Plant, Wickwire-Spencer Steel Div., Birdsboro, Pa.
B7 A. M. Byers, Pittsburgh
B8 Braeburn Alloy Steel Corp., Braeburn, Pa.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C4 Claymont Products Dept., Claymont, Del.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C18 Cold Drawn Steel Plant, Western Automatic Machine Screw Co., Elyria, O.

D1 Detroit Steel Corp., Detroit
D2 Driver, Wilbur B., Co., Newark, N. J.
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire-Reeves Steel Corp., Mansfield, O.
E3 Enamel Products & Plating Co., McKeesport, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.
G5 Green River Steel Corp., Owenboro, Ky.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., New Castle, Ind.
I3 Inland Steel Co., Chicago, Ill.
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Calif.
K2 Keystone Steel & Wire Co., Peoria
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M6 Mystic Iron Works, Everett, Mass.
M7 Milton Steel Products Div., Milton, Pa.
M8 Mill Strip Products Co., Chicago, Ill.
M9 Moltrup Steel Products Co., Beaver Falls, Pa.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Carpenter Steel of New England, Inc., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Steel Corp., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.
P14 Pacific Tube Co.
P15 Philadelphia Steel and Wire Corp.

R1 Reeves Steel & Mfg. Div., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Jones & Laughlin Steel Corp., Stainless and Strip Div.
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon Pa.
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Div. of Copperweld Steel Co., Carnegie, Pa.
S10 Seneca Steel Service, Buffalo
S11 Southern Electric Steel Co., Birmingham
S12 Sierra Drawn Steel Corp., Los Angeles, Calif.
S13 Seymour Mfg. Co., Seymour, Conn.

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago.
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.

Y1 Youngstown Sheet & Tube Co., Youngstown, O.

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.

	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½-3 In.		2 In.		2½ In.		3 In.		3½-4 In.	
STANDARD T. & C.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Youngstown *R3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Fontana *K1*	*10.75	*26.00	*7.75	*22.00	*4.25	*17.50	*1.75	*16.75	*1.25	*15.75	*0.75	*15.25	0.75	*15.50								
Pittsburgh *J3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Alton, Ill. *L1*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Sharon *M3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Fairless *N2*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Pittsburgh *N1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Wheeling *W5*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Wheatland *W4*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Youngstown *Y1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Indiana Harbor *Y1*	1.25	*14.0	4.25	*10.0	7.75	*5.50	10.25	*4.75	10.75	*3.75	11.25	*3.25	12.75	*3.50								
Lorain *N2*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Youngstown *R3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Fairless *N2*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Fontana *K1*	*6.25		*2.25		0.75		1.25		1.75		2.25		2.75									
Pittsburgh *J3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Alton, Ill. *L1*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Sharon *M3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Pittsburgh *N1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Wheeling *W5*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Wheatland *W4*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Youngstown *Y1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Indiana Harbor *Y1*	5.75	*8.0	9.75	*4.0	12.75	0.50	13.25	*0.75	13.75	0.25	14.25	0.75	14.75	*0.50								
Lorain *N2*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50

Threads only, buttweld and seamless, 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.

Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½ and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 11.00¢ per lb.

(Effective Oct. 26, 1959)

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	$1.84	T-1
18	4	1	—	5	2.545	T-4
18	4	2	—	—	2.005	T-2
1.5	4	1.5	8	—	1.20	M-1
6	4	3	6	—	1.59	M-3
6	4	2	5	—	1.345	M-2

High-carbon chromium.. .955 D-3, D-5
Oil hardened manganese .505 O-2
Special carbon ..... .38 W-1
Extra carbon ..... .38 W-1
Regular carbon ..... .325 W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

CLAD STEEL

Base prices, cents per lb f.o.b.

	Cladding	Plate (*L4, C4, A3, J2*) 10 pct	15 pct	20 pct	Sheet (*I2*) 20 pct
Stainless Type	302	.....	.....	.....	37.50
	304	28.80	31.55	34.30	40.00
	316	42.20	46.25	50.25	58.75
	321	34.50	37.75	41.05	47.25
	347	40.80	44.65	48.55	57.00
	405	24.60	26.90	29.25	.....
	410	22.70	24.85	27.00	.....
	430	23.45	25.65	27.90	.....

CR Strip (S9) Copper, 10 pct, 2 sides, 42.50; 1 side, 35.85.

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Tie Plates	Track Bolts Untreated
Bessemer *U1*	5.75	6.725	7.25	.....	.....	.....
Cleveland *R3*	.....	.....	.....	.....	.....	15.35
So. Chicago *R3*	.....	.....	.....	10.10	.....	.....
Ensley *T2*	5.75	6.725	.....	.....	.....	.....
Fairfield *T2*	.....	6.725	.....	10.10	6.875	.....
Gary *U1*	5.75	.....	.....	.....	6.875	.....
Huntington, *C16*	.....	6.725	.....	.....	.....	.....
Ind. Harbor *I3*	.....	.....	.....	10.10	.....	.....
Johnstown *B3*	.....	6.725	.....	.....	.....	.....
Joliet *U1*	.....	.....	7.25	.....	.....	.....
Kansas City *S2*	.....	.....	.....	10.10	.....	15.35
Lackawanna *B3*	5.75	6.725	7.25	.....	6.875	.....
Lebanon *B3*	.....	.....	7.25	.....	.....	15.35
Minnequa *C6*	5.75	7.225	7.25	10.10	6.875	15.35
Pittsburgh *P5*	.....	.....	.....	.....	.....	14.75
Pittsburgh *J3*	.....	.....	.....	10.10	.....	.....
Seattle *B2*	.....	.....	.....	.....	6.75	15.85
Steelton *B3*	5.75	.....	7.25	.....	6.875	.....
Struthers *Y1*	.....	.....	.....	10.10	.....	.....
Torrance *C7*	.....	.....	.....	.....	6.75	.....
Williamsport *S5*	.....	6.725	.....	.....	.....	.....
Youngstown *R3*	.....	.....	.....	10.10	.....	.....

COKE

	Net-Ton
Furnace, beehive (f.o.b.) Connellsville, Pa.	$14.50 to $15.50
Foundry, beehive (f.o.b.)	$18.50
Foundry oven coke	
Buffalo, del'd	$33.25
Detroit f.o.b.	32.00
New England, del'd	33.55
New Haven, f.o.b.	31.00
Kearney, N. J., f.o.b.	31.25
Philadelphia, f.o.b.	31.00
Swedeland, Pa., f.o.b.	31.00
Painesville, Ohio, f.o.b.	34.35
Erie, Pa., f.o.b.	32.00
Cleveland, del'd	34.19
Cincinnati, del'd	32.84
St. Paul, f.o.b.	31.25
St. Louis, f.o.b.	33.00
Birmingham, f.o.b.	30.35
Milwaukee, f.o.b.	32.60
Neville Is., Pa.	30.75

LAKE SUPERIOR ORES

51.50% Fe natural, delivered lower Lake ports. Interim prices for 1959 season. Freight changes for seller's account.

	Gross Ton
Openhearth lump	$12.70
Old range, bessemer	11.85
Old range, nonbessemer	11.70
Mesabi, bessemer	11.60
Mesabi, nonbessemer	11.45
High phosphorus	11.45

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Fully Processed
Field	.....	9.875	.....
Armature	11.70	11.20	11.70
Elect.	12.40	11.90	12.40
Special Meter	.....	12.475	.....
Motor	13.55	13.05	13.55
Dynamo	14.65	14.15	14.65
Trans. 72	15.70	15.20	15.70
Trans. 65	16.30	Grain Oriented	
Trans. 58	16.80	Trans. 80	19.70
Trans. 52	17.85	Trans. 73	20.20
		Trans. 66	20.70

Producing points: Aliquippa (*J3*); Beech Bottom (*W5*); Brackenridge (*A3*); Granite City (*G2*); Indiana Harbor (*I3*); Mansfield (*E2*); Newport, Ky. (*A9*); Niles, O. (*S1*); Vandergrift (*U1*); Warren, O. (*R3*); Zanesville, Butler (*A7*).

ELECTRODES

Cents per lb. f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE Diam. (In.)	Length (In.)	Price	CARBON* Diam. (In.)	Length (In.)	Price
24	84	27.25	40	100,110	12.50
20	72	26.50	35	110	11.20
18	72	27.50	30	110	11.70
14	72	27.25	24	72	11.95
12	72	28.25	20	90	11.55
10	60	29.50	17	72	12.10
10	48	30.00	14	72	12.55
7	60	29.75	10	60	13.80
6	60	33.25	8	60	14.25
4	40	37.00			
3	40	39.25			
2½	30	41.50			
2	24	64.00			

* Prices shown cover carbon nipples.

REFRACTORIES

Fire Clay Brick

Carloads per 1000

Super duty, Mo., Pa., Md., Ky.	$185.00
High duty (except Salina, Pa., add $5.00)	140.00
Medium duty	125.00
Low duty (except Salina, Pa., add $2.00)	103.00
Ground fire clay, net ton, bulk	22.50

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$158.00
Childs, Hays, Latrobe, Pa.	163.00
Chicago District	168.00
Western Utah	183.00
California	165.00
Super Duty Hays, Pa., Athens, Tex., Windham, Warren, O., Morrisville	163.00-168.00
Silica cement, net ton, bulk, Latrobe	29.75
Silica cement, net ton, bulk, Chicago	26.75
Silica cement, net ton, bulk, Ensley, Ala.	27.75
Silica cement, net ton, bulk, Mt. Union	25.75
Silica cement, net ton, bulk, Utah and Calif.	39.00

Chrome Brick

Per net ton

Standard chemically bonded, Balt.	$109.00
Standard chemically bonded, Curtiner, Calif.	119.00
Burned, Balt.	103.00

Magnesite Brick

Standard, Baltimore	$140.00
Chemically bonded, Baltimore	119.00

Grain Magnesite

St. ⅝ to ⅛-in. grains

Domestic, f.o.b. Baltimore in bulk.	$73.00
Domestic, f.o.b. Chewalah, Wash., Luning, Nev. in bulk	46.00
in sacks	52.00-54.00

Dead Burned Dolomite

Per net ton

F.o.b. bulk, producing points in: Pa., W. Va., Ohio	$16.75
Missouri Valley	15.60
Midwest	17.00

(Effective Oct. 26, 1959)

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard Q Coated Nails Col	Woven Wire Fence Col	"T" Fence Posts Col	Single Loop Bale Ties Col	Galv. Barbed and Twisted Barbless Wire Col	Merch. Wire Ann'ld ¢/lb.	Merch. Wire Galv. ¢/lb.
Alabama City *R3*	173	187	...	212	193	9.00	9.55
Aliquippa *J3****	173	190	...		190	9.00	9.675
Atlanta *A8***	175	192	...	214	198	8.75	9.425
Bartonville *K2***	175	192	178	214	198	9.10	9.775
Buffalo *W6*	.....	.....	.....	.....	.....	9.00	9.55*
Chicago *N4***	177	190	172	212	196	9.00	9.70
Chicago *R3*	.....	.....	.....	.....	.....	9.00	9.55
Cleveland *A6*	.....	.....	.....	.....	.....	.....	.....
Cleveland *A5*	.....	.....	.....	.....	.....	9.00	.....
Crawf'dsv. *M4***	175	192	...	214	198	9.10	9.775
Donora, Pa. *A5*	173	187	...	212	193	9.00	9.55
Duluth *A5*	173	187	...	212	193	9.00	9.55
Fairfield, Ala. *T2*	173	187	...	212	193	9.00	9.55
Galveston *D4*	9.10‡	.....	.....	.....	.....	.....	.....
Houston *S2*	178	192	...	217	198	9.25	9.80†
Jacksonville *M4*	184-1	197	...	219	203	9.10	9.775
Johnstown *B3***	173	190	174	...	196	9.00	9.675
Joliet, Ill. *A5*	173	187	...	212	193	9.00	9.55
Kokomo *C9*	175	189	...	214	195*	9.10	9.65*
L. Angeles *B2****	.....	.....	.....	.....	.....	9.95	10.625
Kansas City *S2**	178	192	...	217	198*	9.25	9.80†
Minnequa *C6*	178	192	182	217	198†	9.25	9.80†
Monessen *P6*	.....	.....	.....	.....	193	8.65	9.325
Palmer, Mass. *W6*	.....	.....	.....	.....	.....	9.30	9.85*
Pittsburg, Cal. *C7*	192	210	...	...	213	9.60	10.15
Rankin, Pa. *A5*	173	187	...	...	193	9.00	9.55
So. Chicago *R3*	173	187	...	...	193	8.65	9.20
S. San Fran. *C6*	.....	.....	.....	236	.....	9.95	10.50†
Sparrows Pt. *B3***	175	.....	.....	214	198	9.10	9.775
Struthers, O. *Y1**	.....	.....	.....	.....	.....	8.65	9.20
Worcester *A5*	179	.....	.....	.....	.....	9.30	9.85
Williamsport *S5*	.....	.....	.....	.....	.....	.....	.....

* Zinc less than .10¢. *** .10¢ zinc.
** 11-12¢ zinc. † Plus zinc extras.
‡ Wholesalers only.

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26-0.40	0.41-0.60	0.61-0.80	0.81-1.05	1.06-1.35
Anderson, Ind. *G4*	8.95	10.40	12.60	15.60	18.55
Baltimore, Md. *T8*	9.50	10.70	12.90	15.90	18.85
Bristol, Conn. *W12*	.....	10.70	12.90	16.10	19.30
Boston *T8*	9.50	10.70	12.90	15.90	18.85
Buffalo, N. Y. *R7*	8.95	10.40	12.60	15.60	18.55
Carnegie, Pa. *S9*	8.95	10.40	12.60	15.60	18.55
Chicago	.....	.....	.....	15.60	.....
Cleveland *A5*	8.95	10.40	12.60	15.60	18.55
Dearborn *S1*	9.05	10.50	12.70	.....	.....
Detroit *D1*	9.05	10.50	12.70	15.70	.....
Detroit *D2*	9.05	10.50	12.70	.....	.....
Dover, O. *G4*	8.95	10.40	12.60	15.60	18.55
Evanston, Ill. *M8*	9.05	10.40	12.60	.....	.....
Franklin Park, Ill. *T8*	9.05	10.40	12.60	15.60	18.55
Harrison, N. J. *C11*	.....	.....	12.90	16.10	19.30
Indianapolis *R5*	9.10	10.55	12.60	15.60	18.55
Los Angeles *C1*	11.15	12.60	14.80	17.80	.....
New Britain, Conn. *S7*	9.40	10.70	12.90	15.90	18.85
New Castle, Pa. *B4*	8.95	10.40	12.60	15.60	.....
New Haven, Conn. *D1*	9.40	10.70	12.90	15.90	.....
Pawtucket, R. I. *N7*	9.50	10.70	12.90	15.90	18.85
Riverdale, Ill. *A1*	9.05	10.40	12.60	15.60	18.55
Sharon, Pa. *S1*	8.95	10.40	12.60	15.60	18.55
Trenton, *R6*	.....	10.70	12.90	16.10	19.30
Wallingford *W1*	9.40	10.70	12.90	15.90	18.55
Warren, Ohio *T4*	8.95	10.40	12.60	15.60	18.75
Worcester, Mass. *A9*	9.50	10.70	12.90	15.90	18.85
Youngstown *R5*	9.10	10.55	12.60	15.60	18.55

BOILER TUBES

$ per 100 ft. carload lots cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	Size B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
Babcock & Wilcox	2	13	40.28	47.21	35.74
	2½	12	54.23	63.57	48.13
	3	12	62.62	73.40	55.59
	3½	11	73.11	85.70	65.84
	4	10	97.08	113.80	88.10
National Tube	2	13	40.28	47.21	35.74
	2½	12	54.23	63.57	48.13
	3	12	62.62	73.40	55.59
	3½	11	73.11	85.70	65.84
	4	10	97.08	113.80	88.10
Pittsburgh Steel	2	13	40.28	47.21	.....
	2½	12	54.23	63.57	.....
	3	12	62.62	73.40	.....
	3½	11	73.11	85.70	.....
	4	10	97.08	113.80	.....

METAL POWDERS

Cents per lb, minimum truckload, delivered E. of Miss. River, unless otherwise noted.

Iron Powders

Compacting Powders

Electrolytic, imported, f.o.b.	29.50 to 33.00
Electrolytic, domestic	34.50
Sponge	11.25
Atomized	11.25
Hydrogen Reduced	11.25 to 12.00
Carbonyl	88.00
Welding Powders*	8.10
Cutting and Scarfing Powders*	9.10

Copper Powders

Electrolytic, domestic	41.00
Precipitated	40.50 to 45.00
Atomized	39.80 to 48.30
Hydrogen reduced, f.o.b.	43.25
Bronze	47.20 to 51.50
Chromium, electrolytic	$5.00
Lead	19.00
Manganese, f.o.b.	42.00
Molybdenum	$3.60 to $3.95
Nickel	$1.05 to $1.03
Nickel Silver	53.50
Nickel Steel	13.00
Solder	13¢ plus metal value
Stainless Steel, 302	$1.07
Stainless Steel, 316	$1.26
Steel, atomized, prealloyed, 4600 series	14.00 plus metal value
Tin	14¢ plus metal value
Titanium, 99.25+%, per lb., f.o.b.	$11.25
Tungsten	$3.15 (nominal)

* F.O.B., shipping point.

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

Pct. Discounts

Bolts	1-4 Containers	5 Containers	20,000 Lb.	40,000 Lb.
Machine				
½" and smaller x 3" and shorter	55	57	61	62
⅝" diam. x 3" and shorter	47	49½	54	55
¾" thru 1" diam x 6" and shorter	37	39½	45	46
¾" thru 1" diam. longer than 6" and 1½" and larger x all lengths	31	34	40	41
Rolled thread, ½" and smaller x 3" and shorter	55	57	61	62
Carriage, lag, plow, tap, blank, step, elevator and fitting up bolts ½" and smaller x 6" and shorter	48	50½	53	56

Note: Add 25 pct for less than container quantity. Distributor prices are 5 pct less on bolts and square nuts.

Nuts, Hex, HP reg. & hvy.	Full case or Keg price
¾ in. or smaller	62
⅞ in. to 1½ in. inclusive	56
1⅝ in. and larger	51½

C. P. Hex, reg. & hvy.	
¾ in. or smaller	62
⅞ in. to 1½ in. inclusive	56
1⅝ in. and larger	51½

Hot Galv. Hex Nuts (All Types)	
¾ in. and smaller	41

Semi-finished Hex Nuts	
¾ in. or smaller	62
⅞ in. to 1½ in. inclusive	56
1⅝ in. and larger	51½

(Add 25 pct for broken case or keg quantities)

Finished	
⅞ in. and smaller	65

Rivets	*Base per 100 lb*
½ in. and larger	$12.85
	Pct. Off List
7/16 in. and smaller	15

Cap Screws *Discount (Packages)*

Full Finished H. C. Heat Treat

New std. hex head, packaged	Full Case
⅝" diam. and smaller x 6" and shorter	54 / 42
¾", ⅞", and 1" diam. x 6" and shorter	38 / 23
⅝" diam. and smaller x longer than 6"	.. / ..
¾", ⅞", and 1" diam. x longer than 6"	.. / ..

	C-1018 Steel Full-Finished Cartons	Bulk
¼" through ⅝" dia. x 6" and shorter	59	48
¾" through 1" dia. x 6" and shorter	45	32

Minimum quantity—¼" through ⅝" diam., 15,000 pieces; 7/16" through ⅝" diam., 5,000 pieces; ¾" through 1" diam., 2,000 pieces.

Machine Screws & Stove Bolts

Plain Finish	Discount Mach. Screws	Stove Bolts
Cartons	60	60
Bulk		
Quantity		
To ¼" diam. incl. — 25,000-and over	60	..
5/16 to ½" diam. incl. — 15,000-200,000	60	..

Machine Screws & Stove Bolt Nuts

	Discount Hex	Square
In Cartons	16	19
Quantity		
In Bulk		
⅜" diam. & smaller — 25,000-and over	15	16

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, frt allowed in quantity)

Copper	
Rolled elliptical, 18 in. or longer, 5000 lb lots	44.50
Electrodeposited	36.00
Brass, 80-20, ball anodes, 2000 lb or more	51.50
Zinc, ball anodes, 2000 lb lots (for elliptical add 1¢ per lb)	16.00
Nickel, 99 pct plus, rolled carton, 5000 lb	1.0225
(Rolled depolarized add 3¢ per lb)	
Cadmium, 5000 lb	1.20
Tin, ball anodes $1.05 per lb (approx.).	

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	65.90
Copper sulphate, 100 lb bags, per cwt.	22.75
Nickel salts, single, 100 lb bags	36.00
Nickel chloride, freight allowed, 100 lb	45.00
Sodium cyanide, domestic, f.o.b. N. Y., 200 lb drums	24.70
(Philadelphia price 25.00)	
Zinc cyanide, 100 lb	60.75
Potassium cyanide, 100 lb drum N. Y.	45.50
Chromic acid, flake type, 10,000 lb or more	30.44

CAST IRON WATER PIPE INDEX

Birmingham	125.8
New York	138.5
Chicago	140.9
San Francisco-L. A.	148.6

Dec. 1955, value, Class B or heavier 5 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1955, issue. Source: U. S. Pipe and Foundry Co.

STEEL SERVICE CENTERS

Metropolitan Price, dollars per 100 lb.

Cities	City Delivery‡ Charge	Sheets: Hot-Rolled (18 ga. & hvr.)	Sheets: Cold-Rolled (15 gage)	Sheets: Galvanized (10 gage)††	Strip: Hot-Rolled	Plates	Shapes: Standard Structural	Bars: Hot-Rolled (merchant)	Bars: Cold-Finished	Alloy Bars: Hot-Rolled 4615 As rolled	Alloy Bars: Hot-Rolled 4140 Annealed	Alloy Bars: Cold-Drawn 4615 As rolled	Alloy Bars: Cold-Drawn 4140 Annealed
Atlanta		8.59	9.87	10.13	8.91	9.29	9.40	9.39	13.24	.....	.....	.....	.....
Baltimore**	$.10	9.90	10.10	10.09	11.55	10.00	10.65	10.15	11.90	17.48	16.48	21.58	20.83
Birmingham**		9.43	10.20	10.46	10.91	9.79	10.00	9.59	13.14	16.76	.....	.....	.....
Boston**	.10	10.52	11.27	11.82	12.17	10.42	10.72	10.34	13.45	17.69	16.69	21.79	21.04
Buffalo**	.15	9.80	10.50	11.35	11.30	10.25	10.40	9.90	11.60	17.45	16.45	21.55	20.80
Chicago**	.15	8.69	10.35	11.05	10.35	8.62	9.16	8.79	10.80	17.10	16.10	19.70	20.45
Cincinnati**	.15	8.86	10.41	11.10	10.67	9.00	9.84	9.11	11.68	17.42	16.42	21.52	20.77
Cleveland**	.15	8.69[1]	9.89	11.02	10.47	8.88	9.67	8.90	11.40	17.21	16.21	21.31	20.56
Denver	.20	9.60	11.84	12.94	9.63	9.96	10.04	10.00	11.19	.....	.....	.....	20.84
Detroit**	.15	8.95	10.61	11.40	10.72	8.99	9.84	9.10	11.16	17.38	16.38	21.48	21.03
Houston**		9.65	9.65	.....	10.85	9.65	9.35	8.90	13.10	17.50	16.55	21.55	20.85
Kansas City	.15	9.82	10.27	11.37	9.33	9.71	9.82	9.81	10.22	16.87	15.87	20.37	19.62
Los Angeles**		9.95[1]	11.55	12.20	11.55	10.00	10.00	9.10	14.20	18.30	16.45	21.30	20.80
Memphis	.15	8.55	9.80	.....	8.60	8.93	9.01	8.97	12.11	.....	.....	.....	.....
Milwaukee**	.15	8.83	10.49	11.19	10.49	8.76	9.30	8.93	11.04	17.24	15.34	21.24	19.09
New York	.10	9.27	10.59	11.40	9.74	9.87	9.84	10.09	13.35	16.16	15.60	20.10	19.35
Norfolk	.20	8.20	.....	.....	8.90	8.65	9.20	8.90	10.70	.....	.....	.....	.....
Philadelphia	.10	8.30	9.35	10.71	9.35	9.25	9.29	9.50	12.05	16.58	15.58	20.08	19.33
Pittsburgh**	.15	8.69	9.84	10.91	10.45	8.62	9.78	8.79	11.40	17.10	16.10	19.70	20.45
Portland		10.00	11.75	13.30	11.95	11.50	11.10	9.85	15.30	18.50	17.45	20.75	20.25
San Francisco**	.10	11.00	11.95[2]	11.50	12.25	11.00	10.95	10.75	15.20	18.30	16.35	22.90	20.60
Seattle**		11.55	12.30	12.50	12.65	11.00	10.20	11.10	16.20	18.60	17.80	22.70	22.20
Spokane**	.15	11.70	12.45	12.65	13.30	11.15	11.35	11.75	16.35	17.75	17.95	21.58	22.35
St. Louis**	.15	9.07	10.73	11.02	10.73	9.00	9.76	9.17	11.43	17.48	16.48	21.58	19.33
St. Paul**	.15	8.95	9.46	10.62	10.47	8.75	9.48	8.85	11.64	.....	16.69	.....	21.04

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may be combined with each other for quantity. ** These cities are on net pricing. Prices shown are for 2000 lb item quantities of the following: Hot-rolled sheet—10 ga. x 36 x 96—120; Cold-rolled sheet—20 ga x 36 x 96—120; Galv. sheet—10 ga x 36—120; Hot-rolled strip—⅛ x 1"; Plate—¼" x 84"; Shapes—I-Beams 6 x 12.5; Hot-rolled bar—Rounds—⅝-2 15/16; Cold-finished bar—C 1018—1" rounds; Alloy bar—hot-rolled 4615—1⅝" to 2⅜"; cold drawn—15/16" to 2⅜" round; Hot-rolled 4140—⅝" to 2⅜" round, cold drawn—15/16" to 2⅜" round.

†† 10¢ zinc. ‡ Deduct for country delivery. [1] 15 ga. & heavier; [2] 14 ga. & lighter.

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Birdsboro, Pa. *B6*	68.00	68.50	69.00	69.50	.....
Birmingham *R3*	62.00	62.50*	.....	.....	.....
Birmingham *W9*	62.00	62.50*	66.50	.....	.....
Birmingham *U4*	62.00	62.50*	66.50	.....	.....
Buffalo *R3*	66.00	66.50	67.00	67.50	.....
Buffalo *H1*	66.00	66.50	67.00	67.50	.....
Buffalo *W6*	66.00	66.50	67.00	67.50	.....
Chester *P2*	68.00	68.50	69.00	.....	.....
Chicago *I4*	66.00	66.50	66.50	67.00	.....
Cleveland *A5*	66.00	66.50	66.50	67.00	71.00†
Cleveland *R3*	66.00	66.50	66.50	67.00	.....
Duluth *I4*	66.00	66.50	66.50	67.00	71.00†
Erie *I4*	66.00	66.50	66.50	67.00	71.00†
Everett *M6*	67.50	68.00	68.50	.....	.....
Fontana *K1*	75.00	75.50	.....	.....	.....
Geneva, Utah *C7*	66.00	66.50	.....	.....	.....
Granite City *G2*	67.90	68.40	68.90	.....	.....
Hubbard *Y1*	.....	.....	66.50	.....	.....
Ironton, Utah *C7*	66.00	66.50	.....	.....	.....
Midland *C11*	66.00	.....	.....	.....	.....
Minnequa *C6*	68.00	68.50	69.00	.....	.....
Monessen *P6*	66.00	.....	.....	.....	.....
Neville Is. *P4*	66.00	66.50	66.50	67.00	71.00†
N. Tonawanda *T1*	.....	66.50	67.00	67.50	.....
Sharpsville *S3*	66.00	.....	66.50	67.00	.....
So. Chicago *R3*	66.00	66.50	66.50	67.00	.....
So. Chicago *W8*	66.00	.....	66.50	67.00	.....
Swedeland *A2*	68.00	68.50	69.00	69.50	.....
Toledo *I4*	66.00	66.50	66.50	67.00	.....
Troy, N. Y. *R3*	68.00	68.50	69.00	69.50	73.00
Youngstown *Y1*	.....	.....	66.50	.....	.....

DIFFERENTIALS: Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, $2 per ton for 0.50 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. Add $1.00 for 0.31–0.69 pct phos.

Silvery Iron: Buffalo (6 pct), *H1*, $79.25; Jackson *J1*, *I4* (Globe Div.), $78.00; Niagara Falls (15.01–15.50), $101.00; Keokuk (14.01–14.50), $103.50; (15.51–16.00), $106.50. Add $1.00 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 18 pct. Add $1.25 for each 0.50 pct manganese over 1.00 pct. Bessemer silvery pig iron (under .10 pct phos.); $64.00. Add $1.00 premium for all grades silvery to 18 pct.

† Intermediate low phos.

STAINLESS STEEL

* Base price cents per lb. f.o.b. mill

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	22.75	24.75	24.00	26.25	—	28.00	41.25	33.50	38.50	—	17.50	—	17.75
Slabs, billets	28.00	31.50	29.00	32.75	33.25	34.50	51.25	41.50	48.25	—	22.25	—	22.50
Billets, forging	—	37.75	38.75	39.50	42.50	42.00	64.50	48.75	57.75	29.25	29.25	29.75	29.75
Bars, struct.	43.50	44.50	46.00	46.75	49.75	49.50	75.75	57.50	67.25	35.00	35.00	35.50	35.50
Plates	39.25	40.00	41.25	42.25	45.00	45.75	71.75	54.75	64.75	30.00	30.00	31.25–31.75	31.00
Sheets	48.50	49.25	51.25	52.00	56.75	55.00	80.75	65.50	78.25	40.25	40.25	48.25	40.75
Strip, hot-rolled	36.00	39.00	37.25	40.50	—	44.25	69.25	53.50	63.50	—	31.00	—	32.00
Strip, cold-rolled	45.00	49.25	47.50	52.00	56.75	55.00	80.75	65.50	78.25	40.25	40.25	42.50	40.75
Wire CF; Rod HR	—	42.25	43.50	44.25	47.25	47.00	71.75	54.50	63.75	33.25	33.25	33.75	33.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11*; Brackenridge, Pa., *A3*; Butler, Pa., *A7*; Vandergrift, Pa., *U1*; Washington, Pa., *W2*, *J2*; Baltimore, *E1*; Middletown, O., *A7*; Massillon, O., *R3*; Gary, *U1*; Bridgeville, Pa., *U2*; New Castle, Ind., *I2*; Detroit, *M2*; Louisville, O., *R5*.

Strip: Midland, Pa., *C11*; Waukegan, Cleveland, *A5*; Carnegie, Pa., *S9*; McKeesport, Pa., *F1*; Reading, Pa., *C2*; Washington, Pa., *W2*; W. Leechburg, Pa., *A3*; Bridgeville Pa., *U2*; Detroit, *M2*; Detroit, *S1*; Canton, Massillon, O., *R5*; Harrison, N. J., *D3*; Youngstown. *R5*; Sharon, Pa., *S1*; Butler, Pa., *A7*; Wallingford, Conn., *U3* (plus further conversion extras); *W1* (25¢ per lb. higher); Seymour, Conn., *S13*, (25¢ per lb. higher); New Bedford, Mass., *R6* Gary, *U1*, (25¢ per lb. higher); Baltimore, Md., *E1* (300 series only).

Bar: Baltimore, *A7*; S. Duquesne, Pa., *U1*; Munhall, Pa., *U1*; Reading, Pa., *C2*; Titusville, Pa., *U2*; Washington, Pa., *J2*; McKeesport, Pa., *U1*, *F1*; Bridgeville, Pa., *U2*; Dunkirk, N. Y., *A3*; Massillon, O., *R5*; S. Chicago, *U1*; Syracuse, N. Y., *C11*; Watervliet, N. Y., *A3*; Waukegan, *A5*; Canton, O., *T5*, *R3*; Ft. Wayne, *I4*; Detroit, *R5*; Gary, *U1*; Owensboro, Ky., *G5*; Bridgeport, Conn., *N8*; Ambridge, Pa., *B7*.

Wire: Waukegan, *A5*; Massillon, O., *R3*; McKeesport, Pa., *F1*; Ft. Wayne, *J4*; Newark, N. J. *D2*; Harrison, N. J., *D3*; Baltimore, *A7*; Dunkirk, *A3*; Monessen, *P1*; Syracuse, *C11*; Bridgeville, *U2*; Detroit, *R5*; Reading, Pa., *C2*; Bridgeport, Conn., *N8*.

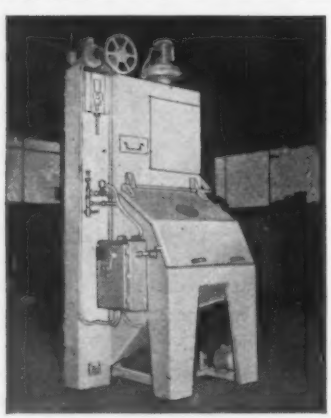
Structurals: Baltimore, *A7*; Massillon, O., *R3*; Chicago, Ill., *J4*; Watervliet, N. Y., *A3*; Syracuse, *C11*; S. Chicago, *U1*.

Plates: Ambridge, Pa., *B7*; Baltimore, *E1*; Brackenridge, Pa., *A3*; Chicago, *U1*; Munhall, Pa., *U1*; Midland, Pa., *C11*; New Castle, Ind., *I2*; Middletown, *A7*; Washington, Pa., *J2*; Cleveland, Massillon, *R3*; Coatesville, Pa., *C15*; Vandergrift, Pa., *U1*; Gary, *U1*.

Forging billets: Ambridge, Pa., *B7*; Midland, Pa., *C11*; Baltimore, *A7*; Washington, Pa., *J2*; McKeesport, *F1*; Massillon, Canton, O., *R3*; Watervliet, *A3*; Pittsburgh, Chicago, *U1*; Syracuse, *C11*; Detroit, *R5*; Munhall, Pa., S. Chicago, *U1*; Owensboro, Ky., *G5*; Bridgeport, Conn., *N8*; Reading, Pa., *C2*.

(Effective Oct. 26, 1959)

MACLEOD



BLAST CLEANING EQUIPMENT

•

CUSTOM DESIGNED *to your* INDIVIDUAL REQUIREMENTS

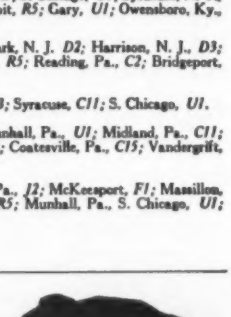
•

Since 1897, MACLEOD has won an excellent reputation as a manufacturer of "tailor-made" blast cleaning equipment. The shot-peening machine shown above, for instance, was specially designed and built to meet the customer's exact requirements and specifications. Among other distinctive features, the machine includes an elevator and a dust collecting section. Shot peening cycle is timer-controlled and turntable is motor driven. Write for descriptive literature on all MACLEOD Blast Cleaning Equipment—Rooms, Cabinets, Machines, and Dust Arresters—that can be custom-designed to your individual requirements.

The MACLEOD Company
44 MOSTELLER RD., CINCINNATI 41, OHIO

The Improved

FLEX-A-FOAM Dust Mask



Your best *ounce* of *protection* against

IRRITATING DUST

HERE'S WHY:

• **Workers wear it.** Lightweight (just 1 ounce), snug, comfortable and easy-to-breathe through, Flex-A-Foam is the one respirator your workers actually welcome.

• **It's super-efficient.** Flex-A-Foam's pure latex filter protects against nuisance dust particles 100 times smaller than the eye can see!

• **It's simple.** Only four sturdy, long-wearing parts — all interlocking — all unconditionally guaranteed.

• **And—it's economical.** Low first cost — less than any other quality respirator on the market. Low upkeep — washable filter outlasts throw-away type by more than 100 to 1!

Dust Protection Your Workers Will Welcome and Wear

Sample $1.45 postpaid (Industrial price only)

FLEX-A-FOAM DUST MASK

FLEXO PRODUCTS, INC. • Westlake, Ohio

FERROALLOY PRICES

Ferrochrome

Cents per lb contained Cr, lump, bulk, carloads, del'd. 67-71% Cr, .30-1.00% max. Si.

0.02% C....	41.00	0.50% C....	38.00
0.05% C....	39.00	1.00% C....	37.75
0.10% C....	38.50	1.50% C....	37.50
0.20% C....	38.25	2.00% C....	37.25

4.00-4.50% C, 60-70% Cr, 1-2% Si.. 37.25
3.50-5.00% C, 57-64% Cr, 2.00-4.50% Si 28.25
0.025% C (Simplex) 39.75
8% max C, 50-55% Cr, 6% max Si. 25.75
4½% max C, 50-55% Cr, 2% max Si 26.50

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome max. 0.10% C price schedule.

Chromium Metal

Per lb chromium, contained, packed, delivered, ton lots, 97.25% min. Cr, 1% max. Fe.

0.10% max. C	$1.29
9 to 11% C, 88-91% Cr, 0.75% Fe...	1.38

Electrolytic Chromium Metal

Per lb of metal 2" x D plate (⅛" thick) delivered packed, 99.80% min. Cr. (Metallic Base) Fe 0.20 max.

Carloads	$1.15
Ton lots	1.17
Less ton lots	1.19

Low Carbon Ferrochrome Silicon

(Cr 39-41%, Si 42-45%, C 0.05% max.) Carloads, delivered, lump, 3-in. x down, packed.

Price is sum of contained Cr and contained Si.

	Cr	Si
Carloads, bulk	28.25	14.60
Ton lots	33.50	16.05
Less ton lots	35.10	17.70

Calcium-Silicon

Per lb of alloy, lump, delivered, packed. 30-33% Cr, 60-65% Si, 3.00 max. Fe.

Carloads, bulk	24.00
Ton lots	27.95
Less ton lots	29.45

Calcium-Manganese—Silicon

Cents per lb of alloy, lump, delivered, packed.
16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads, bulk	23.00
Ton lots	26.15
Less ton lots	27.15

SMZ

Cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ½ in. x 12 mesh.

Ton lots	21.15
Less ton lots	22.40

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5: 38-42% Cr, 17-19% Si, 8-11% Mn, packed.

Carload lots	18.45
Ton lots	19.95
Less ton lots	21.20

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload bulk	19.20
Ton lots to carload packed	21.15
Less ton lots	22.40

Ferromanganese

Maximum base price, f.o.b., lump size, base content 74 to 76 pct Mn. Carload lots, bulk.

Producing Point	Cents per-lb
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	12.25
Johnstown, Pa.	12.25
Neville Island, Pa.	12.25
Sheridan, Pa.	12.25
Philo, Ohio	12.25
S. Duquesne	12.25

Add or substract 0.1¢ for each 1 pct Mn above or below base content.

Briquets, delivered, 66 pct Mn:

Carloads, bulk	14.80
Ton lots packed in bags	17.20

Spiegeleisen

Per gross ton, lump, f.o.b. Palmerton, Pa., and Neville Island, Pa.

Manganese	Silicon	
16 to 19%	3% max.	$100.50
19 to 21%	3% max.	102.50
21 to 23%	3% max.	105.00

Manganese Metal

2 in. x down, cents per pound of metal delivered.

95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed	45.75
Ton lots	47.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.

Carloads	34.00
Ton lots	36.00
250 to 1999 lb	38.00
Premium for Hydrogen - removed metal	0.75

Medium Carbon Ferromanganese

Mn 80 to 85%, C 1.25 to 1.50, Si 1.50% max., carloads, lump, bulk, delivered, per lb of contained Mn 25.50

Low-Carb Ferromanganese

Cents per pound Mn contained, lump size, packed, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	(Bulk) 37.15	39.95	41.15
0.07% max. C	35.10	37.90	39.10
0.10% max. C	34.35	37.15	38.35
0.15% max. C	33.60	36.40	37.60
0.30% max. C	32.10	34.90	36.10
0.50% max. C	31.60	34.40	35.60
0.75% max. C, 80.85% Mn, 5.0-7.0% Si	28.60	31.40	32.60

Silicomanganese

Lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢ f.o.b. shipping point.

Carloads bulk	12.80
Ton lots, packed	14.45
Carloads, bulk, delivered, per lb of briquet	15.10
Briquets, packed pallets, 2000 lb up to carloads	17.50

Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct., f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $106.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $93.00.

Silicon Metal

Cents per pound contained Si, lump size, delivered, packed.

	Ton lots,	Carloads,
98.25% Si, 0.50% Fe..	22.45	21.25
98% Si, 1.0% Fe	21.95	20.65

Silicon Briquets

Cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si, briquets.

Carloads, bulk	8.00
Ton lots, packed	10.80

Electric Ferrosilicon

Cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point.

50% Si....	14.60	75% Si....	16.90
65% Si....	15.75	85% Si....	18.60
	90% Si....	20.00	

Ferrovanadium

50-55% V delivered, per pound, contained V, in any quantity.

Openhearth	3.20
Crucible	3.30
High speed steel	3.40

Calcium Metal

Eastern zone, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
100 to 1999 lb..	2.40	3.30	4.55

(Effective Oct. 26, 1959)

Alsifer, 20% Al, 40% Si, 40% Fe, f.o.b. Suspension Bridge, N. Y., per lb.

Carloads, bulk	9.85¢
Ton lots	11.20¢

Calcium molybdate, 43.6-46.6% f.o.b. Langeloth, Pa., per pound contained Mo $1.50

Ferrocolumbium, 58-62% Cb, 2 in. x D, delivered per pound

Ton lots	$3.45
Less ton lots	3.50

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, del'd ton lots, 2-in. x D per lb con't Cb plus Ta $3.40

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth, Pa., per pound contained Mo.. $1.76

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $5.00 unitage, per gross ton $120.00
10 tons to less carload $131.00

Ferrotitanium, 40% regular grade 0.10% C max., f.o.b. Niagara Falls, N. Y., and Cambridge, O., freight allowed, ton lots, per lb contained Ti $1.35

Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Cambridge, O., freight allowed, ton lots, per lb contained Ti $1.50
Less ton lots $1.54

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton $255.00

Ferrotungsten, ¼ x down packed, per pounds contained W, ton lots delivered ..... $2.15 (nominal)

Molybdic oxide, briquets per lb contained Mo, f.o.b. Langeloth, Pa. $1.49
bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.38

Simanal, 20% Si, 20% Mn, 20% Al, f.o.b. Philo, Ohio, freight allowed per lb.

Carload, bulk lump	18.50¢
Ton lots, packed lump	20.50¢
Less ton lots	21.00¢

Vanadium oxide, 86-89% V_2O_5 per pound contained V_2O_5 .... $1.38

Zirconium silicon, per lb of alloy

35-40% del'd, carloads, bulk..	26.25¢
12-15%, del'd lump, bulk-carloads	9.25¢

Boron Agents

Borosil, per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B
2000 lb carload $5.50

Ferro Zirconium Boron, Zr 50% to 60%, B 0.8% to 1.0%, Si 8% max., C 8% max., Fe balance, f.o.b. Niagara Falls, New York, freight allowed, in any quantity per pound ..... 30¢

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4-5-7.5%, f.o.b., Suspension Bridge, N. Y., freight allowed.
Ton lots per pound ..... 18.25¢

Ferroboron, 17.50 min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, ton lots.. $1.20
F.o.b. Wash., Pa., Niagara Falls, N. Y., delivered 100 lb up

10 to 14% B	.85
14 to 19%	1.20
19% min. B	1.50

Grainal, f.o.b. Cambridge, O., freight, allowed, 100 lb and over

No. 1	$1.05
No. 79	50¢

Manganese-Boron, 75.00% Mn, 17.50% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.

Ton lots (packed)	$1.46
Less ton lots (packed)	1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots 2.15

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Used "As Is" and Reconditioned
RAILWAY CARS
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SERVICE-TESTED
FREIGHT CAR REPAIR PARTS
For All Types of Cars

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General Electric
44-Ton Standard Gauge
In ICC Operating Condition

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1—125-Ton, 52'6"
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(1)—2200-HP Whse. Motor, 600-V.D.C., 92/132 R.P.M., enclosed, F.Vent.
(4)—700-HP Whse. Motors, 250-V.D.C., 300/700 R.P.M., enclosed, F.Vent.
(2)—645-HP S.S. Motors, 300-V D.C., 1000 R.P.M., enclosed, F.Vent.
(2)—600-HP Allis-Chalmers Motor, 600-V.D.C., 300/600 R.P.M., mill type.
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We can supply suitable Motor Generator Sets with any of the above.
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(1)—1875 K.W. Whse. motor generator set 250 V.D.C. with 2700 HP., motor 13800/6900 V. and control.
(1)—2500-HP, 296 R.P.M. Allis-Chalmers slip ring motor, 2200-V., 3 ph., 60 cy.
(1)—1800-HP, 252 R.P.M. Whse. slip ring motor, 2300-v., 3 ph., 60 cy.
(3)—1500-HP, 444 R.P.M. General Electric slip ring motors. 6600/4160-V., 3 ph., 60 cy.
★ ★ ★ ★ ★ ★ ★
(1)—1250-KBA Whse. Hi-Cycle Frequency Set, 800-V., 960 cycle with 1875-HP syn. motor, 2300-V., 3 ph., 60 cy. with all switchgear.
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Phone Davenport 4-8300

Strike Effects Hit Midwest Dealers

Used machine dealers in the Midwest are starting to feel the effects of the steel strike.

Business is slowing down, but they are optimistic about an upturn in two months.

▪ Effects of the steel strike have begun to nibble at the edges of the strong sales upcurve Midwestern tool sellers have enjoyed since early this year. Reports over the past two weeks indicate that the new inquiry rate has begun to falter.

First reports suggest that market softness is being felt in heavy production equipment. One heavy sheer, an item that was regarded as a red-hot sales potential at the beginning of the month, is still waiting for any buyer interest.

Business Holds—Thus far, the softness is more felt than actually seen. Many dealers report their October sales levels will at least equal September business. But, as they carefully point out, much of October business was done in the early part of the month. The fall-off is of more recent date.

Heavy sheet metal working equipment still leads from a demand standpoint. But it is in this class of tool that reports of a slowdown have been most frequent. Light production and tool room equipment, as well as demand from job shop tool buyers, is continuing at a good pace. Rebuilders also report that their current work level is holding up well. In many cases, the backlog is at absolute zero, but incoming orders are in sufficient volume to keep rebuild crews working a full, one-shift-per-day week.

Two Month Lull—What's going to happen next? Most tool men are guessing at a 60 day lull, though not a heavy drop-off, in tool sales. After that, they say, the used tool industry will kick off for a rising level of new business that will carry well through 1960.

Why the continued optimism? For one thing, tool prices are continuing at a very strong level. The approach of some large auctions in Detroit, as well as at least two auctions of government tool stocks in the Midwest, have had absolutely no effect on pricing. Dealers who, until the slowdown, had hoped to strengthen shop inventories of reconditioned tools, report that they are still not having great success in getting equipment at the lower prices that were expected when the steel strike stretched into its present length.

Rebuild Jobs—For the tool user, this looks like a fairly good time to contract for rebuild jobs on equipment that will be needed in the near future. Steel stocks in rebuild shops are in fairly good shape. Deliveries are excellent, users report. And rebuilders are out looking for business with quick delivery as a sales hook.

There is one note of caution that is beginning to be apparent among Midwestern tool distributors. A few shops that were hard at rebuilding stocks last month are slowing up slightly now.

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Model 115P Logemann Box 100" l, 48" w. 24" d. Bale size 24" x 14" x 16"

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13' x 3/16" Bertsch Initial Type—New 1957
32' x ⅜" Baldwin Pyramid Type—New 1942

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90 ton Niagara, Model 90-8-10
16' x 10 Ga. Clearing
18' x ¾" Southwark 800 ton

CRANES—OVERHEAD ELECTRIC TRAVELING

5 ton P&H	40' Span 220 Volt D.C.
10 ton P&H	55' Span 230/3/60
10 ton P&H	39' Span 230 Volt D.C.
10 ton Milwaukee	57' Span 230 Volt D.C.
10 ton Whiting	75' Span 220/3/60 A.C.
10 ton Shaw	120' Span 230 Volt D.C.
15 ton Milwaukee	56' Span 440/3/60 A.C.
15 ton Shepard Niles	55' 6" Span 220/3/60
20 ton P&H	57" 6" Span 230/3/60
30 ton Shaw	70' Span 230 Volt D.C.
120 ton Niles	67' Span 230 Volt D.C.
120 ton Shepard Niles	77' Span 220/3/60 A.C.

DRAW BENCHES
7,000 lb. Draw Bench, 51 ft. Draw
10,000 lb. Draw Bench, 50 ft. Draw
30,000 lb. Draw Bench, 41 ft. Draw
35,000 lb. Draw Bench, 41 ft. Draw

DRILL—RADIAL
6'—17" Col. American

FLANGING MACHINE
⅝" Blue Valley No. 4

FORGING MACHINES
1" to 5" Acme, Ajax, National

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15 ton Electric Melting Furnace Top Charge—LATE Complete with transformer

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No. 35 U. S. Multi-Slide, Max width of stock 4½" x .089 thick, length of feed 12½"

NIBBLER
Pullmax Model 2, Capacity 11/32"

PICKLE LINE
48" Hot Strip Pickle Line, M.G. Set. Uncoiler, Scale Breaker, Leveler, Dryer, Upcoiler, Conveyor

PRESSES—HYDRAULIC
300 ton Southwark Platen 28" x 28", Stroke 25"
500 ton Watson Stillman Piercing Press, 48" x 72"
1000 ton Southwark Bed 44" x 54", Stroke 20"
4500 ton B-L-H Bed 68" x 68", Stroke 40"

PUNCH & SHEAR COMBINATIONS
#2½ Buffalo Ironworker
Coper & Notcher, Punch 1"x⅝", Shear 2½" Rd. 2" Sq.
#4½ x 30 U. D. Buffalo Punch, Shear, Bar Cutter, Punch 1½ x 1⅛; Shear 3" Rd., 2½" Sq., 6 x 6 x ⅝" Angles

ROLLS—FORMING
8 Stand, Tinken 7⅝" C to C of rolls

ROLLING MILLS
Treadwell Ring Rolling Mill for 7" wide strip
10" x 10" Single Stand Two High
10" x 14" Single Stand Two High
13" x 16" Single Stand Two High
16" x 24" Two Stand Two High
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12" x 32" Birdsboro 3-Hi Bar Mill
22" x 40" Lewis 3-Hi Sheet Mill

ROLLS—PLATE STRAIGHTENING
72" McKay 9 Rolls 15" Dia. Backed-up
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60" x 10 Ga. Cut-off Line
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SHEARS—ROTARY
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10' x ¼" Cincinnati
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36" Waterbury Farrel, Slitting Line, Arbor 4½" Dia.
36" Paxson Slitting Line, 4½" Dia. Arbor

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Torrington #1734 12 Roll. Cap. 1⅜", Rd. 1-9/16"

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1		2250 HP DC MOTOR 600 V. 400/500 RPM, G.E. M.G. Set—2000 K.W. G.E. AC Motor—2300 V.
1		1500 HP DC MOTOR 600 V. 680 RPM Whse. M.G. Set. 1500 KW G.E. 11000 V.

For listing of Motors, Generators, Transformers, M.G. Sets, Rectifiers, Mill Motors, etc. See last week issue.

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AIR CLUTCH UPSETTERS & STEAM HAMMERS

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18x66" Landis Universal Type C, m.d., late
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PLAIN CYLINDRICAL GRINDERS
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6x18" Cincinnati Model EA, m.d.
6x18" Landis Type C Hydraulic, m.d., late
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6x30" Cincinnati Plain Hydraulic Model ER, m.d.
10x18" Cincinnati Plain Hydraulic, Model ER, m.d., Filmatic Spindle, 1943
10x18" Cincinnati Model EA, m.d.
10x18" Norton Type C, m.d., latest
10x18" Cincinnati Model ER Plain, m.d.
10x36" Cincinnati Hydraulic, m.d.
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Will sell all or part.

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Waterbury Farrel 50000# Draw Bench 32 ft. centers
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A. Loring Rowe, Vice President and Secretary

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$150/MO. UP—NO INVESTMENT REQUIRED
1560 Ton Bliss, 53x72" bed, 24" stroke
800 Ton Hamilton, 41x54", 16" & 32" str.
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135 TONS—STEEL COILS
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c/o The IRON AGE, Chestnut & 56th, Phila. 39

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10 ton 1½" Rd. 18' lg. air. qual. SAE 9315
30 ton 2¼" Rd. C.D. 10' lg. Sil-Chrome Alloy
10 ton ¾" x 2½" Mild Steel 20' lg.
15 ton 1¼" x 2½" Mild Steel 20' lg.
30 ton ⅞" x 94" x 15' Mild Plate
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Numerous sizes Alloy Bars and Struc. Shapes

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100 KVA Thomson Spot Welder, 24" Throat.
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19 pcs. 10" BP 42# x 57'/60'
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16 pcs. 12" BP 74# x 45'/60'
5 pcs. 12" BP 74# x 70'0"
16 pcs. 14" BP 73# x 25'/40'

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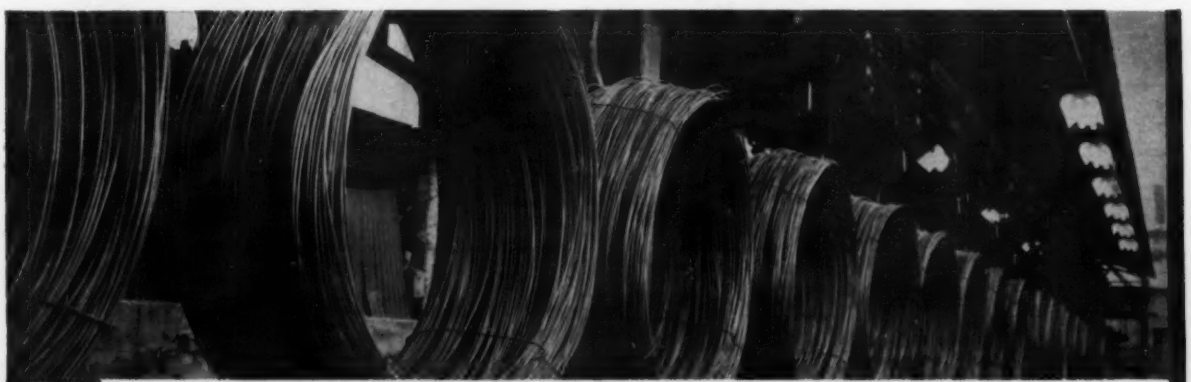

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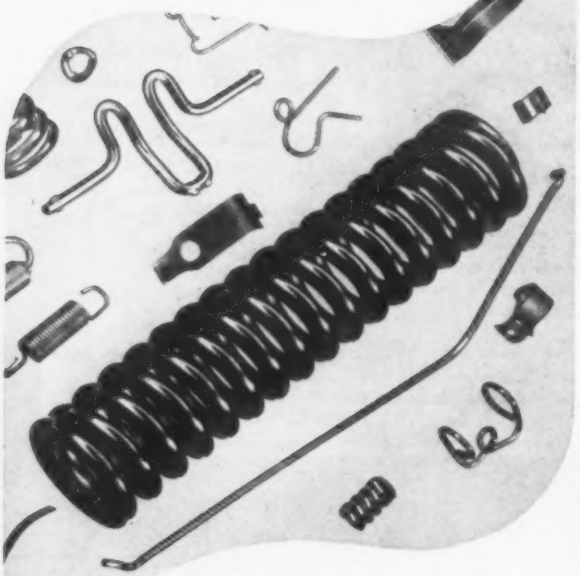

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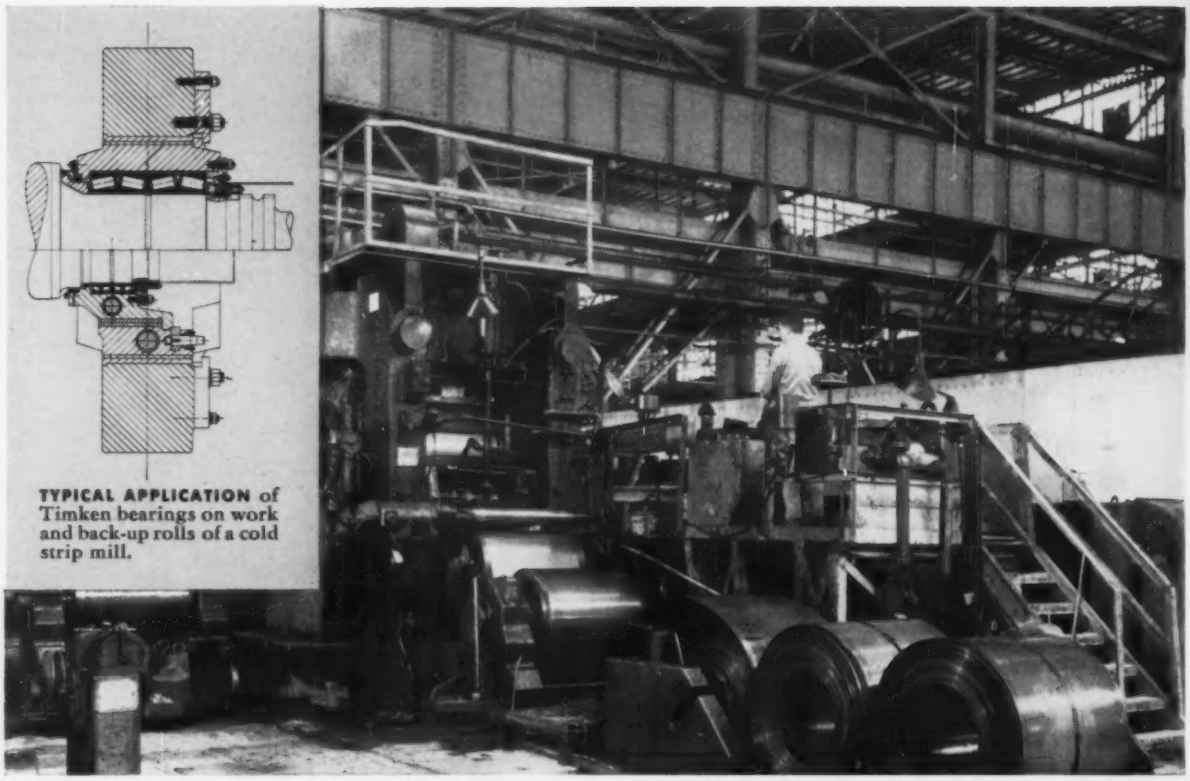

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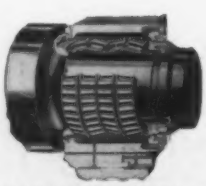

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